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MINUTES OF THE PROCEEDINGS

OF THE

METEOROLOGICAL COUNCIL

1902–1903.

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MINUTES OF THE PROCEEDINGS

OF THE

METEOROLOGICAL COUNCIL.

1902–1903.

63, *Victoria Street, S.W., April* 11, 1902.

PRESENT:

SIR R. STRACHEY, IN THE CHAIR.

MR. BUCHAN. | THE HYDROGRAPHER.

MR. SHAW, *Secretary.*

281. The Minutes of the last meeting (March 14) were read and confirmed.

282. *Storm Signals after Dark.*—Resolved—that the Marine Superintendent be instructed to prepare a report on the replies received to the inquiries respecting the exhibition of storm signals at night.

283. *Registrar General's Meteorological Returns.*—Read—the following letter (M.O. 591):—

M.O. 591.

General Register Office,
Somerset House, London, W.C.,
25th March, 1902.

DEAR SIR,

I REGRET to inform you that Mr. Glaisher, F.R.S., of Croydon, who for a long series of years has contributed his valuable remarks on meteorology for the periodical returns issued by this Office, has been obliged to relinquish his task in consequence of failing health.

Dr. Tatham, who has recently seen you on this subject, tells me that he has explained to you, generally, the nature of the information required, and has left with you specimens of Mr. Glaisher's contributions to our Annual Report and Annual Summary, as well as to our weekly and quarterly returns.

May I ask whether it will be agreeable to you to undertake, on my behalf, the duties which have hitherto been so efficiently performed by Mr. Glaisher, and if so, whether you would desire to make any modifications in the several "forms of return" now in use for the purpose?

I am, &c.,
REGINALD MACLEOD,
Registrar General.

To W. N. Shaw, Esq., M.A., F.R.S.,
Secretary, Meteorological Office.

The Secretary reported that he had provisionally undertaken to prepare the weekly return for the Registrar General's report from the reports sent by the observers at stations previously in correspondence with Mr. Glaisher, at the request of the Registrar General. He also submitted the following memorandum:—

RETURNS FOR THE REGISTRAR GENERAL.

The Meteorological information at present published by the Registrar General comprises the following items:—

I. WEEKLY REPORT (Published on Wednesdays for the week ended on the previous Saturday. Copy required by mid-day on Tuesday).

(a) A short note (five lines) on the climatological results for London during the week—derived from Greenwich observations (p. 150).

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(b) Part of Table 3: A table of temperature, humidity, rainfall, and sunshine for Greenwich for each of the thirteen weeks ended on the Saturday (p. 154).

(c) Table 8: A table of temperatures (highest, lowest, and mean) and rainfall for London, Edinburgh, Dublin, and 12 towns in England.

(d) Table 9: Summary of meteorological observations at Greenwich during the week.

II. QUARTERLY REPORT.

(a) Remarks on the weather during the quarter arranged according to separate months (pp. 75–78).

(b) Monthly Meteorological Table of results for 28 Second Order Stations, not unlike international Form B, but including ozone data, some vapour data not given in Form B. The results for the separate months are given.

(c) Quarterly Summary of the above with notes of extremes.

(d) Quarterly Meteorological Table for different parallels of latitude.

(e) Columns 19 and 20 (mean temperature and rainfall) in Table V., 33 Great Towns, Population, &c.

III. ANNUAL SUMMARY.

(a) Table 25: Greenwich results for each week of the year.

(b) Table 27: Greenwich results for the months.

(c) Table 28: Greenwich results for the quarters.

IV. ANNUAL REPORT.

(a) Table 37: Greenwich results for each year for the fifty years up to the date of the report.

(b) Table 38: Apparently Table 28 of the Annual Summary reproduced.

(c) Table 39: Apparently Table 27 of the Annual Summary reproduced.

(d) Table 40: Mean Annual Values of Meteorological Elements for 25 towns.

(e) Table 41: Meteorological Elements (mean monthly results for parallels of latitude).

(f) Remarks on the Meteorology of the year.

With regard to the tables based upon Greenwich observations, I have no information as to whether they were supplied from the observatory in the form in which they appear in the Registrar General's report or compiled by Mr. Glaisher from observations furnished in some other form. They refer to mean values for long periods of years which the Office does not possess. From the point of view of continuity of record, it may be desirable that these tables should be continued as heretofore, if the Astronomer Royal is willing to supply them. It may, however, be remarked that the tables based upon Greenwich observations are used in comparative statistical tables for London. The question whether returns for some more central position should not be substituted for some of the Greenwich returns needs consideration.

Meteorological information similar in all essential particulars to that included in the Reports, is already prepared in the Office, and included in the Weekly Weather Report and its Supplements and Appendices. The only important points of difference are (1) that the Office reports refer to the whole of the United Kingdom, whereas the Registrar General's returns and remarks refer almost exclusively to England; and (2) that the Office returns are almost exclusively from what may be called rural or suburban stations, and give data for the open country, whereas the Registrar General's returns include observations from urban stations, about the precise position of which I have no information, but which may be regarded as to some extent affected by the specially urban character of the surroundings.

With regard to the first of these two points, I see no disadvantage attaching to the application of the remarks to a wider area, provided England and Wales are sufficiently represented; and with regard to the second, I consider that from the Registrar General's point of view, special importance would be attached to the returns from urban stations, and that feature should be preserved, and at the same time, for the purposes of comparison, the results for the Office districts should also be given.

The only other point that calls for general remark is that some of the tables refer to parallels of latitude. These are not climatological lines of division, and the Office arrangement into districts, with possibly a further subdivision into coast and inland stations, would be more useful.

Assuming that the Greenwich returns are continued as heretofore, the arrangements which would work in most easily with the practice of the Office would be as follows:—

In lieu of—

I.—(a) An extract from the general remarks at the foot of the front page of the Weekly Weather Report.

(b) Greenwich Return.

(c) Table 8: A table of climatological data temperature (highest, lowest, and mean) rainfall and sunshine for the six districts of England and Wales, and for any urban stations within them, for which competent observers are willing to send in returns.

(d) Greenwich Return.

II.—(a) Remarks on the weather for the three months included in the quarter—reproducing the remarks of the three monthly summaries of the Weekly Weather Report for that quarter.

(b) Monthly Meteorological Table: Returns from urban, suburban, and rural stations (divided into coast and inland stations) in Form B, containing three several months under each station.

(c) Quarterly summary of the above, omitting notes of extreme values that already appear in the monthly returns.

(d) Quarterly summary for different districts, instead of parallels of latitude.

(e) Information as before.

III.—(a), (b), (c) } Greenwich Returns.

IV.—(a), (b), (c) } Greenwich Results.

(d) Table 40: Mean annual values for urban stations.

(e) Table 41: Mean annual values for Office districts, as given in Quarterly Summary of Weekly Weather Report.

(f) Part of the extract from the Annual Report on Striking Meteorological Occurrences of the year.

It is, however, to be remarked that the Council have two different forms of tabulating monthly results for publication, namely: (1) that contained in the Monthly Summaries of the Weekly Weather Report; and (2) the international Form B, according to which the annual volume of observations at stations of the Second Order is prepared. This latter form is adopted by the Registrar General for Ireland.

The Scottish Meteorological Society adopt a third and different form for returns of practically similar observations for presentation to the Society and the Registrar General for Scotland. The Royal Meteorological Society again has a slightly different form for the Meteorological Record issued to its members. It seems desirable that the forms adopted by the Registrars General should be identical, and it would also be convenient that returns issued by the societies should be in similar form. Considerations of space may make it necessary for returns to be abbreviated, but they might all with advantage be derived from one standard form.

Accordingly I suggest that before proposing any form to the Registrar General, the Council should take steps to consult the Scottish Meteorological Society and the Royal Meteorological Society with a view to agreement upon a single form for the presentation of monthly results.

W. N. S.

The Secretary's action was approved, and it was resolved that the Royal Meteorological Society and the Scottish Meteorological Society be invited to send a representative to confer with the Secretary at the Office at 11 a.m. on Thursday, 8th May, with a view to suggesting a common form for presentation of monthly results, and that the Registrar General be also invited to send a representative; and, further, that Sir J. W. Moore, M.D., of Dublin, be invited to be present if he is able to be so.

284. *Antarctic Expedition.*—Read—the following letter (M.O. 599):—

M.O. 599.

National Antarctic Expedition,
1, Savile Row, Burlington Gardens, W.,
26th March, 1902.

SIR,

REPORTS and collections of specimens have been received from the Antarctic Expedition, having been despatched during the stay of the "Discovery" at Littleton, New Zealand.

I am desired by the Presidents of the Royal and Royal Geographical Societies to request that your Committee will receive the meteorological reports and journals, and favour me with reports for the information of the Presidents.

I am, &c.,
CYRIL LONGHURST,
Secretary.

The Secretary,
Meteorological Office.

The Secretary was instructed to express the willingness of the Council to receive the Meteorological reports and journals and to make inquiry as to the reports asked for by the Presidents.

285. *Mauritius—Note on Cyclones of February*, 1902.—Read—a memorandum from the Under Secretary of State for the Colonies (M.O. 576) forwarding papers on recent cyclonic disturbances in the Indian Ocean including a chart of cyclone tracks, for perusal and return, and a memorandum by the Marine Superintendent upon the papers forwarded.

The Secretary was directed to thank the Under Secretary for forwarding the papers and to say that he would put himself into communication with Mr. Claxton on the matter.

286. *Falmouth—Dines' Anemometer.*—Read—the following letter (M.O. 609) :—

M.O. 609.

Admiralty,
29th March, 1902.

SIR,

MY Lords Commissioners of the Admiralty having had before them your letter of the 20th ult., No. M.O. 716, desire me to request you will inform the Meteorological Council that there is no objection so far as the Admiralty is concerned to a Dines' anemometer being placed in the Coastguard signal station on the tower of Pendennis Castle, and in charge of the Chief Officer of Coastguard at Falmouth.

As, however, the Castle is War Department property, it is suggested that the Council should obtain the concurrence of the War Office to this proposal and request that a pass should be furnished to their Inspector.

I am to add that when the new War Signal Station at St. Anthony's Point is established, it is proposed to retain the look-out hut at Pendennis Castle for Coastguard purposes.

I am, &c.,
H. J. VAUGHAN NEALE.

The Secretary,
Meteorological Office.

The Secretary was directed to apply to the War Office for the necessary permissions and passes and to proceed with the arrangements for installing an anemometer at the signal station in Pendennis Castle.

287. *Royal Meteorological Society—Kite Experiments* (Minute 154).—Read—the following letter(M.O. 673) :—

M.O. 673.

Oxshott, Leatherhead,
April 10th, 1902.

DEAR SHAW,

THE Meteorological Council having kindly undertaken to equip and support a base station in connexion with the forthcoming observations on the temperature, &c., of the upper air by means of kites, I write to inform you that at a meeting held yesterday the Joint Committee decided that it would be desirable to have the accompanying list of instruments, and to ask if you will ascertain if the list meets with the approval of the Council.

I presume that many of these instruments are in the possession of the Council, and would be lent to the Kite Committee for the period of the observations.

Captain Hepworth has kindly offered to lend a sextant, and Mr. Bayard has also offered to lend a hygrograph. I can myself supply an indicating anemometer.

With reference to the barograph, you will perhaps remember that you were empowered by the Council to consult with me as to the possibility of obtaining barometric traces by some less expensive method than the photographic. I regret that I have neglected to attend to this matter sooner, but it has occurred to me that the form of barograph that I suggested might be obtained and used for these observations. I have ascertained that Mr. Hicks, of Hatton Garden, will make one to my design for a sum of about £20, and I shall be obliged if you will let me know whether the Directors will sanction this expenditure. The barograph will of course become the property of the Council. I am perfectly confident of it's proving satisfactory, and am prepared to buy it from the Council at cost price should it not do so. I enclose a few weekly traces obtained from a similar instrument. The scale can be altered at pleasure, and I suggest that it should be increased in the ratio of 3 : 2.

Yours sincerely,
W. H. DINES.

List of instruments suggested by the Joint Kite Committee for use at the base station :—

Thermometer screen, with usual thermometers.
Barometer.
Barograph, with day scale.
Thermograph, with day scale.
Anemometer.
Hygrograph.
Sextant.
Rangefinder.

288. *Finance.*—The Secretary reported that after consultation with the Chairman he had invested £750, assigned in the estimates for 1901–2 (Minutes 1900–1901, p. 57) as reserved for superannuation, in the purchase of £791 10*s.* 1*d.* 2½ per cent. annuities at 94⅝.

289. *Office Staff.*—The Secretary reported that Mr. F. W. Snell had become sufficiently proficient in shorthand writing and typewriting (Minutes 7, p. 3, and 2 p. 7, 1900) to be of substantial additional service to the Office.

It was resolved that Mr. Snell be promoted to a third-class clerkship with a commencing salary of £125 to date from April 1, the number of third-class clerkships being increased by one from that date.

290. *Office Keeper.*—The Secretary reported that the responsibility for receiving letters addressed to the Office and distributing them among the different branches was not sufficiently defined, and that the uncertainty arose partly from the fact that the office is open before the office keeper is expected to arrive in the morning and after he leaves in the evening.

It was resolved—(1) that the office keeper attend in future to open the office for the clerks on duty at 8 a.m., and that he be responsible for receiving and distributing all letters delivered at the Office between the opening of the Office at 8 a.m. and 5 p.m.

(2) That the street door of the Office be kept closed until the office keeper arrives in the morning.

(3) That from 5 p.m. till the closing of the Forecast Branch at 8.30 p.m. the clerk in charge of the Forecast Branch be responsible for any letters received.

(4) That arrangements for the proper discharge of the duty in regard to the receipt of letters during holidays and the temporary absence of the office keeper be reported by the chief clerk for approval.

(5) That the salary of the office keeper be £95 per annum from April 1, 1902.

(6) That the printing of addresses be no longer a part of the office keeper's duty.

291. *Office Staff—Increments of Salary.*—The following increments to the Office Staff were allowed (Minutes 1900–1, p. 3 ; 1901–2, pp. 43 and 44) :—

——	Salary in 1901–2.	Proposed for 1902–3.
	YEARLY.	
CLASS I.—MAXIMUM £275–£300 :—	£ s. d.	£ s. d.
R. H. Curtis (Minutes 1901–2, p. 44)	280 0 0	285 0 0
F. J. Brodie (Minutes 1901–2, p. 43)	225 0 0	230 0 0
CLASS II.—MAXIMUM £200 :—		
R. Sargeant (Minutes 1901–2, p. 43)	175 0 0	180 0 0
CLASS III.—MAXIMUM £150 :—		
A. R. Simpkins (Minutes 1901–2, p. 43)	125 0 0	130 0 0
CLASS IV.—MAXIMUM £110 :—		
E. J. Hood (Minutes 1892–3, p. 66)	100 0 0	105 0 0
J. T. Williams (Minutes 1896–7, p. 3)	85 0 0	90 0 0
	WEEKLY.	
BOY CLERKS.—MAXIMUM £1 :—		
A. T. Bench (Minutes 1897–8, p. 77)	0 18 6	1 0 0
H. Prickett (Minutes 1901–2, p. 43)	0 15 6	0 17 0
W. Hayes (Minutes 1901–2, p. 43)	0 14 0	0 15 6
H. E. Carter (Minutes 1901–2, p. 43)	0 12 6	0 14 0

The salary of A. G. Goad (Messenger) was raised from 17*s.* to 18*s.* 6*d.* a week (Minutes 1898–9, p. 93).

292. Reported—that Commissionaire G. Annan (Minute 264) not having proved suitable for the work of this Office, the Adjutant of the Corps had sent Commissionaire T. Hill to replace him, from 7th instant, at the pay of 25*s.* a week, as in the previous case.

293. *Boy Clerks.*—The Secretary was authorised to engage a boy clerk in place of W. G. Eldridge, who had resigned.

294. *Additional temporary Female Clerks.*—The Secretary reported that the tabulation of anemograms required for the purpose of checking the storm warnings was

seriously in arrear, and that the accumulation arose partly from the special difficulties incidental to carrying on the work during the re-arrangement of the Office last summer.

It was agreed that the Secretary be authorised to employ temporarily two additional female clerks at a salary of £1 10*s.* per week each, to bring the tabulations up to date and that he report upon the matter at the next meeting.

295.—*Agency at Dundee.*—Read—letter (M.O. 538) from Mr. J. McGlashan expressing his wish to be relieved of the Agency for the Office at Dundee, and letter (M.O. 658) from Mr. Chas. H. Brown, of 33, Dock Street, assistant teacher at the Government Navigation School, Dundee, asking for the Agency.

The matter was referred to Mr. Buchan for report.

296. *Fog Inquiry—Instruments on Victoria Tower and St. Paul's.*—The Secretary was authorised to make arrangements for continuing for the present the observations of temperature on Victoria Tower and St. Paul's Cathedral with the self-recording instruments lent by him for the fog inquiry.

297. *Publications.*—The presentation of a copy of the Pilot Charts, as issued, to the University College of South Wales and Monmouthshire, Cardiff, was authorised.

The presentation of a copy of the Daily Weather Report to M. Demtchinsky in exchange for his publication "Climate" to the end of the current year was authorised.

In reply to an inquiry from the Stationery Office (M.O. 551) as to the number of copies of past issues of the Weekly, Monthly, and Quarterly Weather Reports to be retained there; it was decided (1) to suggest that the spare sets of Weekly and Monthly Weather Reports in the Office should be made up to 25 complete issues and that the remainder be destroyed, (2) that the Quarterly Weather Reports containing reproductions of original curves be retained.

298. *Publications—Pilot Charts.*—A draft letter (P.C. 934) to the Board of Trade with respect to the proposed alteration of arrangements for the issue of Pilot Charts under Minute 269 was approved.

299. *Observatory Journals.*—An instruction to destroy the original of the Weekly Journals of the self-recording observatories, the data of which had been transcribed and utilised, at the suggestion of Mr. R. H. Curtis, was approved provided the originals for the last two years were retained.

300. *Instruments—Hydrometers at Chatham.*—A letter from Chatham (M.O. 644) respecting 12 hydrometers in store there was referred to the Hydrographer.

301. *New Land Stations.*—The Secretary reported that during the past quarter instruments had been supplied and sites approved for the following land stations :—

Station.	Order.	Observer.
Dunmow—Countess of Warwick's School of Agriculture.	II.	E. E. Hennessey, B.A., B.Sc.
Rhyl	II.	A. A. Goodall, Urban District Council.
Wakefield (Gosforth)	II.	West Riding Agricultural Council.
Ramsgate	Sunshine	Town Clerk.

A site had also been inspected and approved for the Cromer Urban District Council.

302. *Logs.*—Ten received, four excellent.

303. Submitted—The following report on the Forecasts, issued at 8.30 p.m. daily, during the month of March, 1902 :—

The letters used have the following signification :—

a = complete success. | c = partial failure.
b = partial (*i.e.*, more than half) success. | d = total failure.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success. a + b.
Scotland, N.	a	20	65	43	78
,,	b	48	22	35	
,,	c	26	13	19	
,,	d	6	0	3	
Scotland, E.	a	36	61	49	78
,,	b	32	26	29	
,,	c	29	13	21	
,,	d	3	0	1	
England, N.E.	a	39	49	44	76
,,	b	32	32	32	
,,	c	26	19	23	
,,	d	3	0	1	
England, E.	a	42	61	52	84
,,	b	35	29	32	
,,	c	23	7	15	
,,	d.	0	3	1	
Midland Counties	a	36	52	44	85
,,	b	42	39	41	
,,	c	19	9	14	
,,	d	3	0	1	
England, S.	a	52	45	49	81
,,	b	22	42	32	
,,	c	26	13	19	
,,	d	0	0	0	
Scotland, W.	a	55	71	63	78
,,	b	19	10	15	
,,	c	16	19	17	
,,	d	10	0	5	
England, N.W.	a	36	58	47	85
,,	b	52	23	38	
,,	c	6	19	12	
,,	d	6	0	3	
England, S.W.	a	48	52	50	81
,,	b	26	35	31	
,,	c	23	10	16	
,,	d	3	3	3	
Ireland, N.	a	39	74	57	76
,,	b	32	7	19	
,,	c	19	16	18	
,,	d	10	3	6	
Ireland, S.	a	32	42	37	73
,,	b	42	26	34	
,,	c	20	26	23	
,,	d	6	6	6	
Summary.					
British Islands	a	39	57	48	79
,,	b	35	27	31	
,,	c	21	15	18	
,,	d	5	1	3	

304. *Storm Signals, Castletownshend* (Minute 259).—Read—reply from Admiralty (M.O. 579) sanctioning the hoisting of the signals by the Coastguard at Castletownshend.

The Secretary was directed to proceed with the arrangements.

305. *Storm Warnings*—

The Signals were hoisted on 8 days, the total number of districts warned being 46.

In 19 districts the warnings were justified by subsequent gales (force 8 and upwards) and in 17 districts by subsequent strong winds (force 6 and 7). In 10 districts they were not required; in one of these cases the warning was issued in consequence of an erroneous reading of the barometer reported from Valencia.

GALES EXPERIENCED, FOR WHICH NO WARNINGS WERE ISSUED.

None.

FREDC. GASTER.

306. *Reports of Work.*—March, 1902 :—

MARINE BRANCH.

April 10th, 1902.

Examined 5 new logs.

Districts south of the Equator, between the west coast of Africa and 90° W. longitude. Adding isobars and notes on the winds and seasons to the monthly charts for the coastal regions of South America, and revising Charts as received from Admiralty. The series of coastal charts completed for the 12 months and sent to Admiralty.

Preparing copy of Sea Temperature Charts for Atlantic, Indian, and Pacific Oceans for photo-lithography, for re-issue of official publication No. 59. The copy is now practically ready for lithographer.

Indian Ocean District—from latitude 30° N. to 30° S.—Preparing and extracting data in Office logs.

Monthly Pilot Charts of the North Atlantic and Mediterranean. April chart passed for press. May chart prepared and sent to the lithographer and letterpress passed for press. Preparing charts for June and July. Obtaining sea temperature results for January, February, and March, 1902, and wind and fog results to north of 50° N. latitude for May. Registering and acknowledging reports of Ice and Sea Temperatures and issuing further supplies of Forms.

Sailing Directions for China Sea and South America. Obtaining results of meteorological observations at several places for publication in new issue. Results for 12 stations in China Sea sent to Admiralty.

Hydrographic extract from log of s.s. "Matatua" sent to Admiralty.

Preparing "Short Meteorological Log," new edition of "Rough Book," and also of "Lighthouse Register."

CAMPBELL HEPWORTH,

OBSERVATORY BRANCH.

April 1st, 1902.

Hourly Means.—Volume for 1899. The first instalment of "copy" was sent to the printer on the 6th, but no proofs have yet been received. The calculation of mean results for Aberdeen has been completed, and the tables for Falmouth are now in hand.

Mean Temperature Tables for the British Isles.—The remaining proof sheets of this work have been revised, and the completed volume was finally passed for press on the 11th.

Examination of Observatory Work.—In addition to the examination of curves, &c., from all observatories when received, a few months' temperature tabulations for Fort William, 1900, have been examined, and also the temperature tabulations from Kew up to date.

Miscellaneous.—Bunhill Row sunshine cards July–December, 1901, tabulated for the Royal Meteorological Society.

Copies of the Strathpeffer cards for February made and sent to Dr. Fox.

Copies of the Ben Nevis observatories for three days in February made and sent to Prof. Hergesell.

The Holyhead anemograms have been tabulated weekly and copies sent to Dublin.

The Mean daily temperature at Kew has been obtained up to date for the fog enquiry.

Harmonic curves representing the Mean daily *change* of temperature at Kew have been drawn.

Proofs of a new aneroidogram form engraved on copper have been measured and passed.

Mr. Powers has been daily engaged in the Forecast Branch until about 0.10 p.m.

R. H. CURTIS.

FORECAST BRANCH.

Daily Weather Report, 1902.—All numbers issued. The issue of the Good Friday, Easter Sunday and Monday Reports was greatly facilitated this year—all being issued on Tuesday, February 1; that for Saturday, March 29, was issued on same day. *Monthly Correction Sheet* for February issued.

Weekly Weather Report, 1902.—All numbers issued promptly, and publication of *Monthly Summaries* (in altered form) expedited.

Storm Warning Checking, 1902.—Done to date.

Storm Warning Checking (Final) 1901.—Nearly three months done.

Anemometry Tabulated.—Results handed in—8 months—mainly of Yarmouth. (We are now tabulating the values for each of eight stations, month by month to aid in the Storm Warning Checking.)

Checking of 8.30 *p.m. Forecasts.*—February done and results handed in. March in hand.

Times of Arrival of Foreign Telegrams.—Report for February handed in. March well in hand.

Regular routine work of Branch attended to and conducted satisfactorily.

Inquiries by Wire for Forecasts.—Answered 11, including one from the Admiralty, Devonport.

FREDC. GASTER.

STATISTICAL AND LIBRARY BRANCH.

1. Issue of Publications :—

Daily and weekly publications regularly issued.

Monthly summary of the Weekly Weather Report for December, 1901, and January, 1902, received and issued.

Pilot Charts for April, 1902, received and 183 copies issued. Also 186 copies for other months issued.

Presentation copies of publications—46 in all—issued to captains and officers of ships and others.

2. Statistical and station work :—

Tables for weekly issues of the "Weekly Weather Report" prepared to date.

Tables and working maps for the Monthly Summary of the Weekly Weather Report for February, 1902, prepared and passed for press.

Preface to the Weekly Weather Report for 1901 read in proof and returned for "revise."

Ten-day Means for certain stations supplied to Dr. Neumeyer, Hamburg, to date.

Results for Registrar-General's (Ireland) weekly reports regularly supplied.

Appendix III. to the Weekly Weather Report of 1901 (Means of Temperature, Rainfall, and Sunshine brought up to 1900) proceeded with and copying for the printer completed.

Returns from Stations of the Second Order for 1899 proceeded with and 16 pages signed for press.

3. Library :—

Accessions to Library received and catalogued as reported in "Minutes."

4. Inquiries :—

There were 8 inquiries by letter, and 24 personal enquiries for forecasts or other information. In 6 of the personal inquiries payment was made for the information supplied.

Mr. T. D. Bell was absent on sick leave for 20 days, and Mr. J. A. Curtis was absent on sick leave for 3 days.

JOHN A. CURTIS.

MONTHLY RETURN OF "A." AND "M.O." INSTRUMENTS ON CHARGE.

March, 1902.

——	Barometers.	Aneroids.	Thermometers. Ordinary.	Thermometers. Maximum.	Thermometers. Minimum.	Thermometers. Solar Radiation.	Thermometers. Terr. Radiation.	Screens.	Hydrometers.	Rain Gauges.	Anemometers.	Storm Cones.	Miscellaneous.
"A" ACCOUNT.													
Dr.													
On Charge, 1st Mar., 1902	49	179	231	106	101	—	—	55	41	2	—	—	
Received since ...	12	23	37	24	14	—	—	6	—	—	—	—	
	61	202	268	130	115	—	—	61	41	2	—	—	
Cr.													
Sent out during month	24	66	164	31	29	—	—	6	—	—	—	—	
On Charge, 1st Apr., 1902	37	136	104	99	86	—	—	55	41	2	—	—	
"M.O." ACCOUNT.													2 Sunshine Recorders. 3 Spheres. 1 Barograph. 1 Hygrograph.
Dr.													
On Charge, 1st Mar., 1902	18	3	3	16	4	5	8	4	7	5	1	15	
Received since ...	10	—	26	—	—	—	—	18	4	—	—	—	
	28	3	29	16	4	5	8	22	11	5	1	15	
Cr.													
Sent out during month	10	—	6	—	—	—	—	7	7	—	—	5	2 Sunshine Recorders. 3 Spheres. 1 Barograph. 1 Hygrograph.
On Charge, 1st Apr., 1902	18	3	23	16	4	5	8	15	4	5	1	10	

14th April, 1902. R. F. WALLACE.

307. *Accounts Audit.*—Reported—That the cash accounts for the quarter ended the 31st December last had been this day examined by the Chairman and Dr. Buchan, and would be sent in due course to the Treasury for the Audit Office. The receipts from the 1st October last, when there was a balance of £2,400 15*s.*, were £3,762 15*s.* 1*d.* against £3,688 13*s.* 3*d.* in the corresponding period of the preceding financial year. The payments were £4,153 11*s.* 4*d.* against £4,136 17*s.* 2*d.* during the same period in the previous year. The balance in hand and at the bank on the 31st December, amounted to £2,009 18*s.* 9*d.*, and at the same date in 1900 to £2,433 7*s.* 2*d.*

308. Submitted—The following statement of accounts :—

	£	*s.*	*d.*
Cash balance on 13th March	4,834	18	9
Receipts from 14th March to 10th April ...	3,715	19	2
	8,550	17	11
Cheques drawn from 14th March to 10th April	3,708	14	9
Cash balance on 10th April	£4,842	3	2

309 Submitted—The following list of publications which had been received since the last meeting :—

Alberti, Vittorio.—Sul clima di Napoli. Riassunto generale delle osservazioni meteorologiche fatte nella R. Specula di Capodimonte dal 1866 al 1900.

Amundsen, Roald.—En paatænkt Undersögelsesreise til den magnetiske Nordpol.

Berlin, Königlich Preussisches Meteorologisches Institut.—Ergebnisse der meteorologischen Beobachtungen in Potsdam, 1899.

—— —— Ergebnisse der Niederschlags-Beobachtungen in den Jahren 1897 und 1898.

Brussels, Observatoire Royal.—Annuaire météorologique. 1902.

Carlsruhe, Centralbureau für Meteorologie und Hydrographie.—Niederschlagsbeobachtungen der meteorologischen Stationen im Grossherzogthum Baden. 1901, 1. 2. Halb.

Copenhagen, Dansk Meteorologisk Institut.—Isforholdene i de arktiske Have.

**Geitel, Hans.*—Ueber die Anwendung der Lehre von den Gasionen auf die Erscheinungen der atmosphärischen Elektricität.

Greenwich, Royal Observatory.—Results of the magnetical and meteorological observations made at the Royal Observatory, Greenwich, in the year 1899; under the direction of W. H. M. Christie.

Hellmann, G. und Meinardus, W.—Der grosse Staubfall vom 9 bis 12 März 1901 in Nordafrika, Süd- und Mitteleuropa.

Kidderminister, Medical Officer of Health.—Reports on the health of the Borough by the Medical Officer of Health and Sanitary Inspector. 1901.

London, Admiralty, Hydrographic Department.—Catalogue of Admiralty charts, plans, and sailing directions, 1902.

—— —— —— Sailing directions for the West Coast of England, from the Scilly Islands to the Mull of Galloway, including the Isle of Man. Fifth Edition.

Margules, Max.—Über den Arbeitswert einer Luftdruckvertheilung und über die Erhaltung der Druckunterschiede.

—— —— Material zum Studium der Druckvertheilung und des Windes in Niederösterreich. Zweiter Theil.

Naples, R. Osservatorio di Capodimonte.—Osservazioni meteoriche. 1899–1901. 3 vols.

Pelotas, Lyceu Rio Grandense de Agronomia.—Contribuição para o estudo da climatologia do Rio Grande do Sul. Observações meteorologicas . . . 1893–1900 por G. Minssen.

Perth, Government Astronomer.—The climate of Western Australia, from meteorological observations made during the years 1876–1899. Compiled by W. E. Cooke.

Folis, P.—Contribution à la climatologie des Hautes-Fagnes et de l'Eifel.

—— Das Nachtgewitter vom 1. Juni, 1901, zu Aachen.

Rotch, A. L.—The exploration of the atmosphere at sea by means of kites.

Southport, Fernley Observatory.—Report and results of observations, for the year 1901. By J. Baxendell.

Tinsley, G. W.—The mechanics of a thunderstorm.

Toronto, Magnetical Observatory.—General meteorological register for the years 1900, 1901.

Tyrer, R.—Annual report upon the meteorology of Cheltenham, being an abstract of meteorological observations taken at the Observatory, Prestbury Road, Cheltenham, during the years 1900, 1901.

Vienna, Hydrographischen Dienst in Oesterreich.—Jahrbuch des K. K. hydrographischen Central-Bureau. 7. Jahrg., 1899.

—— *Kais. Akademie der Wissenschaften.*—Berichte der Commission für oceanographische Forschungen. 7. Reihe. Collectiv-Ausgabe aus dem 69. Bande der Denkschr. K. Akad. der Wissensch. A. Forschungen im Rothen Meere. B. Forschungen im Östlichen Mittelmeere.

Washington, Smithsonian Institution.—Smithsonian miscellaneous collections. Vols. 42, 43. 2 vols.

Zi-ka-wei Observatory.—The "De Witte" typhoon, August 1–6, 1901. By the Rev. Louis Froc.

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* Purchased.

63, *Victoria Street, S.W., 25th April*, 1902.

PRESENT :

PROFESSOR DARWIN, IN THE CHAIR.

THE HYDROGRAPHER. | MR. SHAW (*Secretary*).

310. The Minutes of the last meeting (April 11th) were read and confirmed.

311. *Annual Report.*—The Secretary reported that he had given directions for the preparation of the usual statistical appendices, and proposed to incorporate in the usual draft of the Report information derived from a comparision with corresponding particulars for previous years.

Approved.

312. *Registrar General's Returns* (Minute 283).—The Secretary reported that Sir J. W. Moore, M.D., would not be in London for the Meeting on 8th May unless he came expressly for the purpose of attending it.

He was authorised to obtain Sir J. Moore's views upon the form of return by correspondence or otherwise.

313. *Antarctic Expedition* (Minute 284).—Read—letter (M.O. 754) from the Secretary of the Expedition containing a list of reports and journals forwarded to the office, and stating that the Presidents "only wished to be informed whether the work appears to have been well and systematically conducted."

Resolved—that the documents be examined, and a statement sent to the Presidents of the Royal and Royal Geographical Societies.

314. *Royal Meteorological Society—Kite Experiments* (Minute 287).—Resolved—that the following instruments be lent to the Committee :—

(*a*) A thermometer screen with the usual thermometers and a barometer from stock.

(*b*) A barograph constructed in accordance with the suggestion in Mr. Dines's letter at a cost not exceeding £20.

(*c*) A Richard thermograph belonging to the Office, to be first put in order and fitted with an extra wheel to give a daily revolution instead of a weekly one.

315. *Secretary's Scientific Assistant.*—Reported—that, in pursuance of Minute 277, the Chairman and Secretary had selected R. G. K. Lempfert, M.A., of Emmanuel College, Cambridge, formerly Assistant Master and Keeper of the Temple Observatory at Rugby School, for appointment as Scientific Assistant to the Secretary for one year on probation, at a salary of £200, the appointment to date from May 1st.

Approved.

316. *Office Staff.—Increment of Salary.*—The salary of R. F. Wallace (Class III.), was increased from £130 to £135, to date from April 1st, 1902.

317. *Boy Clerk.*—The Secretary reported that he had taken Lester Tarrant, aged 14 years, of the St. Andrew's Street Board School, Clapham, a candidate in the examination for Probationers in the Telegraph Branch in October last, on trial for one month at a salary of 11*s.* per week.

318. *Additional Temporary Female Clerks* (Minute 294).—The Secretary reported he had arranged for Miss B. M. Cave and Miss E. Rogerson to carry out the arrears of tabulation of the anemograms, the salaries to be at the rate of £1 10*s.* per week each, commencing from Monday, April 28th, and the arrangement to be terminable by a week's notice.

Approved.

319. *Agency at Cardiff.*—Submitted the following report by the Marine Superintendent upon a visit to Cardiff, authorised by the Secretary :—

Friday, 25th April.

On Monday afternoon, 14th April, I went to Cardiff, and on the following morning saw Mr. T. L. Ainsley the Agent for this Office at that port. Having represented to him the inconvenience caused by his omissions to send in punctually Quarterly Returns, and comparisons of instruments; and, having examined some of the instruments in his care, I drew his attention to the small number of observers secured by him, and supplied with "M. O. instruments"; although the gross tonnage sailing from Cardiff and Barry together, rivalled that of Liverpool. Mr. Ainsley stated in reply, that some new arrangements he intended making in regard to the carrying on of his business, would enable him to devote more of his time personally to the interests of the Meteorological Office.

While in Cardiff, I made enquiries about another firm to which it appeared to me the Agency might be transferred in case it become necessary to make a change; but this firm has no branch at Barry as Mr. Ainsley's has, and Barry is now the more important of the two ports.

I afterwards visited the Offices of Mercantile Marine at Cardiff, and at Barry and obtained interviews with the Superintendents, and Assistant Superintendents of both Offices, eliciting useful information regarding the demand for Monthly Pilot Charts. At the Shipping Office at Cardiff two Pilot Charts are exhibited on the walls, and the Superintendents and their Assistants there and at Barry, told of their endeavours to push the sale of the Charts, and expressed their interest in them.

I returned to duty at the Office on Wednesday morning 16th April.

C. H.

Approved.

320. *Observatories—Fort William.*—Submitted—a memorandum on some defective curves for July, 1900.

The Secretary was directed to communicate with Mr. Buchan on the subject.

321. *Fog Inquiry—Instruments on Victoria Tower and St. Paul's* (Minute 296).—The Secretary reported that he had provisionally arranged for Mr. W. D. Matthews to continue to attend to the instruments for a payment of 10*s.* 6*d.* per week from April 12th.

Approved.

322. *Pilot Charts* (Minute 269).—It was resolved that presentation copies of the Pilot Charts be sent to the Superintendent of the Mercantile Marine Offices, who take charge of the sale of Charts to Captains and Officers.

323. *Temperature Tables.*—The Secretary reported that he had rejected about 120 copies of the volume of Temperature Tables, on account of defects in the plates, and that the Stationery Office was arranging for the defective copies to be replaced.

He also suggested the issue of a supplement of about 24 quarto pages, containing mean values at the several stations for each five years between 1871 and 1900, in order to give data for the extrapolation of the mean values for 30 years, at stations for which 30 years' observations do not exist, in accordance with the subjoined specimen.

DIFFERENCE TABLES FOR EACH FIVE YEARS FOR THE EXTRAPOLATION OF MEAN VALUES.

January.

Station.	Means for—												
	30 Years.	1871–5.	*	1876–80.	*	1881–85.	*	1886–90.	*	1891–95.	*	1896–1900.	*
SCOTLAND, NORTH.	°	°		°		°		°		°		°	
Sumburgh Head	39·0	39·3	— ·3	38·7	+ ·3	39·0	0	40·2	—1·2	37·1	+1·9	39·6	— ·6
Orkney	38·9	39·5	— ·6	39·0	— ·1	39·1	— ·2	39·4	— ·5	36·9	+2·0	39·4	— ·5
Stornoway	38·7	38·6	+ ·1	38·2	+ ·5	38·6	+ ·1	40·2	—1·5	37·0	+1·7	39·4	— ·7
Dunrobin	38·2	38·7	— ·5	38·1	+ ·1	37·9	+ ·3	39·6	—1·4	35·9	+2·3	39·0	— ·8
Average	—	—	— ·3	—	+ ·2	—	+ ·1	—	—1·2	—	+2·0	—	— ·7
Wick (p. 62) ... ... 25 years 37·6	—	—	—	37·2	—	37·3	—	38·7	—	36·0	—	38·7	—
Glencarron (p. 64) ... 15 years 36·6	—	—	—	—	—	—	—	37·7	—	34·4	—	37·7	—
Fort Augustus (p. 64), 15 years 37·4	—	—	—	—	—	—	—	38·7	—	35·2	—	38·3	—
Fort William (p. 65) ... 15 years 38·8	—	—	—	—	—	—	—	39·5	—	37·2	—	39·9	—

* Correction required to give the 30 years mean.

Approved.

324. *Accounts.*—Submitted—The following Statement of Accounts for the year ending 31st March, 1902 :—

Receipts.	£ s. d.	£ s. d.	Payments.	£ s. d.	£ s. d.
Balance from year 1900–1901	—	3,122 9 1	ADMINISTRATION :		
Parliamentary vote ...	—	15,300 0 0	Council	845 12 6	
Repayment of expenses charged under—			Secretary	625 0 0	
(1.) Incidental expenses	21 6 1		Salaries and wages ...	967 1 2	
(2.) Observatories ...	28 0 5		Rent, fuel, and lighting	725 10 2	
		49 6 6	Incidental and contingent expenses ...	255 14 7	
			Furniture and fittings	21 19 8	
					3,440 18 1
SUPPLY OF INFORMATION :			SPECIAL RESEARCHES :		
Daily Weather Charts and Forecasts ...	293 15 8		Salaries and other charges	—	898 19 8
6 p.m. Charts ...	25 0 0		LAND METEOROLOGY :		
Reports for Press Agencies, &c. ...	271 5 1		Observatories and stations, including remuneration of observers	2,228 10 2	
Telegrams sent abroad	322 12 9		Salaries :— Discussion and reduction of observations, &c. ...	1,325 2 5	
		912 13 6			3,553 12 7
SALE OF INSTRUMENTS, &c. :			WEATHER INFORMATION AND FORECASTS :		
Mercantile Marine account	37 5 10		Telegraphic reports and storm warnings, remuneration of observers, &c.	2,577 2 6	
"M.O." (Stations) account	53 6 0		Salaries:—Preparation and issue of reports and forecasts ...	1,732 1 8	
		90 11 10			4,309 4 2
Repayment of Miscellaneous commissions executed for Colonial and Foreign institutions, &c. ...	—	493 15 4	INSPECTIONS : Salaries and travelling expenses	—	404 4 10
			OCEAN METEOROLOGY :		
			Salaries : —Discussion and reduction of observations... ...	1,352 14 5	
Commission charged on work done for Colonies, &c. ...	—	9 19 4	Expenses incidental to the supply of instruments :—		
			Proportion for care and issue of instruments	130 0 0	
SUPERANNUATION ACCOUNT :			Royal Navy ...	849 9 1	
Annuities	141 11 3		Mercantile Marine	195 14 11	
Interest on Investment	27 17 0				2,527 18 5
		169 8 3	Miscellaneous commissions executed for Colonial and Foreign institutions, &c. ...	—	362 15 3
			SUPERANNUATION ACCOUNT :		
			Pensions and allowances	685 11 3	
			Invested	1,500 0 0	
					2,185 11 3
			BALANCE :		
			Cash at Bank	2,418 2 5	
			„ at Office ...	46 17 2	
					2,464 19 7
		£20,148 3 10			£20,148 3 10

Liabilities.	£ s. d.	Assets.	£ s. d.
To sundry creditors	1,027 5 3	By cash at Bank and at Office ...	2,464 19 7
„ balance	1,857 14 3	„ sundry debtors	419 19 11
	£2,884 19 6		£2,884 19 6

NOTE.—On March 31st the amount of 2½ per cent. Consols held by the Council for the provision of Superannuation Annuities was £1,576 16*s.* 4*d.*

325. *Logs.*—Six received, none excellent.

326. *Storm Warnings:*—

Signals hoisted on five days, districts warned 23.
In four districts the warnings were justified by subsequent gales (force 8 and upwards), and in 12 districts by subsequent strong winds (force 6 or 7). In seven districts they were not required.

GALES EXPERIENCED, FOR WHICH NO WARNINGS WERE ISSUED.

None.

FREDC. GASTER.

327. *Accounts.*—Submitted—The following statement of accounts:—

	£	s.	d.
Cash balance on 10th April	4,842	3	2
Receipts from 11th to 24th April	85	12	7
	4,927	15	9
Cheques drawn from 11th to 24th April	60	4	6
Cash balance on 24th April	£4,867	11	3

328. *Publications.*—Received since the last meeting:—

Bucharest, Institutul Meteorologic al Romaniei.—Analele . . . publicate de S. C. Hepites. Tom. 15, 1899.

—— —— Buletinul lunar al observatiunilor meteorologice din Romania publicat de S. C. Hepites. Anul 10, 1901.

Cambridge, Scientific Instrument Co., Ltd.—Physical and electrical instruments manufactured by the Cambridge Scientific Instrument Company, Ltd.

Halle, Kaiserliche Leopoldino-Carolinische Deutsche Akademie der Naturforscher—Leopoldina. Heft 36-37, 1900-1901.

Hepites, S. C.—Climatologia Bucuresciana. 1898, 1899. Nos. 4, 5. 2 vols.

—— Contributiuni la fisica globului. vi. Determinări magnetice in România c. anul 1900.

—— Materiale pentru climatologia Romaniei. xiv. Repartitiunea ploii pe districte si pe basenuri in Romania in anul 1899 st. n.

—— Levé magnétique de la Roumanie.

—— Sur le régime des pluies en Roumanie.

**Klein, H. J.*—Jahrbuch der Astronomie und Geophysik. 12. Jahrg., 1901.

London, British Association for the Advancement of Science.—Report. Glasgow, 1901.

—— *Meteorological Office.*—Temperature tables for the British Islands. Daily means for the thirty years, 1871 to 1900, with diagrams and additional tables.

San Fernando, Instituto y Observatorio de Marina.—Anales. Seccion 2ª. Observaciones meteorológicas, magnéticas y séismicas. Año 1899. Apéndice: Observaciones pluviométricas de los años 1805 á 1899.

Stonyhurst College Observatory.—Results of meteorological and magnetical observations. By the Rev. W. Sidgreaves. 1901.

Tiflis, Physikalisches Observatorium.—Beobachtungen. 1898.

—— *Physical Observatory.*—Monthly bulletin. Temperature and rainfall of the Caucasus. Vols. 1-3, 1898-1900. 3 vols. (In Russian).

Utrecht, Koninklijk Nederlandsch Meteorologisch Instituut.—Meteorologisch Jaarboek. 1899. 51. Jaarg.

Vienna, K. K. Central Anstalt für Meteorologie und Erdmagnetismus.—Jahrbücher. Jahrg. 1899, 1900. Neue Folge, 36.-37. Bd. 2 vols.

Washington, Department of Agriculture, Weather Bureau.—Bulletin No. 30. W. B. No. 256. Loss of life in the United States by lightning. Prepared . . . by A. J. Henry.

* Purchased.

63, *Victoria Street, S.W.*, 16*th May*, 1902.

PRESENT:

SIR R. STRACHEY (IN THE CHAIR).

MR. BUCHAN.	THE HYDROGRAPHER.
PROFESSOR DARWIN.	MR. SHAW (*Secretary*).

329. The minutes of the last meeting (April 25th) were read and confirmed.

330. *Paris Exhibition.*—Reported—the receipt of a bronze medal for the exhibit at the Paris Exhibition of 1900.

331. *Publications—Pilot Charts.*—The Secretary reported that the Board of Trade had expressed (M.O. 837) their concurrence in the suggestions adopted by the Council in Minute 298, provided they were supplied at the end of each financial year with a statement by the Stationery Office showing the number of charts sent to each Superintendent in the month and the number returned or retained by him; and that he had communicated with the Stationery Office upon the point.

Approved.

332. *Observations in the Estuary of the Humber.*—Read—letter (M.O.) from Captain J. W. Dixon, R.N., of the Humber Conservancy, offering to organise meteorological observations by the crew of a launch used for the work of the Conservancy in the Estuary if the Council would lend the necessary instruments.

It was agreed that the usual observations of a meteorological log aboard ship or those of a land station were unnecessary, and the consideration of a special form for observations of fog in connexion with those of wind and of water and air temperatures was deferred for a report by the Hydrographer upon the matter.

333. *Publications—Presentation Copies.*—The Secretary was authorised to present copies of the Weekly Weather Report to those observers who contribute to the Registrar General's Returns and express a wish to receive the report.

334. *Registrar General's Returns* (Minute 283).—The Secretary reported that the Royal Meteorological Society had appointed Dr. R. H. Scott, and the Scottish Meteorological Society Dr. Buchan, to confer with him respecting the form of return for the Registrar General's reports.

A conference had accordingly been held at the Office on Thursday, May 8th, and the subjoined form was agreed upon as a first draft for the consideration of the Authorities concerned with the preparation of the returns.

No reply to the invitation to send a representative had been received from the Registrar General.

REGISTRAR GENERAL'S QUARTERLY RETURN.

(Specimen.)

MONTHLY METEOROLOGICAL TABLE for the QUARTER ending 1902.

Name of Station, County, and Observer. [The figures give the height of the Cistern of the Barometer above Mean Sea Level.]	1902.	Barometer. Mean Pressure, at 32° F. at Station Level.	Air Temperature. Mean of A. Minimum	Air Temperature. Mean of B. Maximum	Air Temperature. Mean of A and B.	Air Temperature. Difference from Average.†	Absolute Minimum and Maximum. Minimum.	Day of Month.	Maximum.	Day of Month.	Hygrometer. Mean of Observations at 9 a.m. and 9 p.m.* Dry Bulb.	Depression of Wet Bulb.	Vapour Pressure.	Humidity.	Earth Temperature. At 1 foot depth.	At 4 feet depth.	Bright Sunshine. Total Possible.	Total Observed.	Difference from Average.†	Cloud. Mean of Observations of amount at 9 a.m. and 9 p.m.* (Scale 0-10).	Rain and other forms of Precipitation. Number of Days.	Total Fall.	Difference from Average.	Most in a day. Amount.	Day of Month.	Weather, Number of days of Snow.	Hail.	Thunderstorm.	Clear Sky.	Overcast.	Fog.	Gale.	Wind. Force (0-12). Number of Observations of Moderate and Strong Winds.	Wind Direction, No. of Observations at 9 a.m. & 9 p.m.* Calm.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.
		Ins.	°	°	°	°	°		°		°	°	Ins.	%	°	°	Hrs.	Hrs.	Hrs.			Ins.	Ins.	Ins.																			
ENGLAND SOUTH	Jan.	30·164	36·8	46·3	41·6	+2·9	24	15 16	53	3 4 10	40·1	2·0	·208	84	42	43	254	29·0	+3·6	5·9	9	0·64	−1·37	0·18	26	1	—	—	11	13	2	2	13	—	2	6	2	—	2	18	28	4
London, 82 Ft. (F. Gaster, Esq., F.R. Met. Soc.)	Feb.	29·884	30·5	40·8	35·7	−4·6	17	16	54	23	33·1	1·1	·168	88	41	43	274	32·6	−7·6	8·3	11	0·83	−0·86	0·19	22 24	4	—	—	4	21	12	2	5	—	4	14	10	6	10	2	4	6
	Mar.	29·867	37·7	52·5	45·1	+2·4	30	7	62	17	42·6	1·7	·236	86	41	42	364	77·3	−7·9	7·8	11	1·62	+0·13	0·47	14	1	2	1	4	20	6	3	8	4	—	4	—	6	4	16	18	10
Ventnor (Royal National Hospital).	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Eastbourne ..	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

* The Hours of Observation are 9 a.m. and 9 p.m. at all stations unless otherwise expressly stated. Extreme Daily Range of Temperature, Solar Maxima, and Grass Minima are not included in the table. They will be referred to in the prefatory remarks.

† The averages used are obtained from observations extending over years.

Wind Force.—Beaufort Scale (0-12) is used. The number of observations of moderate and strong winds (force 4-7), the number of observations of calms and the number of days' of gale are given in the table.

It was agreed that the form be printed in the minutes and a specimen sent for consideration to those interested in the matter.

335. *Storm Signals* (Minute 282).—The following report by the Marine Superintendent was considered :—

REPORT ON REPLIES RECEIVED FROM THE STORM SIGNAL STATIONS TO ENQUIRIES RESPECTING SIGNALS AFTER DARK.

For convenience, in this Report the replies received from the various Stations have been grouped under the following heads :—Harbour, Coastal, and Ocean Traffic. The list given below includes all Stations from which separate replies have been received.

At those Stations coming under the head of "Harbour" it is surmised that the vessels in port would be able to see and make use of night signals which would not under ordinary conditions be seen by passing vessels.

Under the head of "Coastal" a group of Stations will be found at which night signals would be visible in ordinary weather to coasting vessels, and fishermen generally, but probably would not be visible to ocean-going vessels steering Channel courses. Under the category "Ocean Traffic" there are a large number of Stations controlled by the Trinity House, the Scottish Lighthouse Board, the Irish Light Office and Lloyd's which are not included in this list, and at which night signals are not exhibited. Those Stations only from which replies have been received separately are here dealt with.

The grouping is necessarily rough. In order to make an accurate classification, an intimate acquaintance with the Coastlines and Harbours would be indispensable.

Some Stations have notified a wish to be supplied with night signals, or have intimated that they consider these useful, or necessary. Others have expressed their opinion to the effect that they are not wanted ; or that the day signals by being rendered visible in the rays of the electric light suffice at night, or that there is no night traffic to warrant their use.

Comments of this description are briefly noted after the name of the Station on the lists submitted below. When the name of the Station only is given the reply has been to the effect that no night signals are used and no comment has been added.

The replies from seven Stations—five "Harbour," and two "Coastal"—state that night storm signals are wanted, or considered necessary ; from 20 Stations—10 "Harbour," eight "Coastal," two "Ocean Traffic"—that night storm signals are not wanted ; and from two Stations—"Harbour" (Leith and Devonport)—that arrangements will be made or have been made to use night signals.

Reverting to the replies "Not Wanted." At Hamble, Wisbech ("Harbour") and Filey ("Coastal") there is said to be no night navigation or traffic. At Newport ("Harbour") it is said night signals "would be a source of interference with our own signalling apparatus." At Port Knockie ("Coastal") a green light is hoisted at night for warning, and at Middlesbro', Limerick ("Harbour"), Southport ("Coastal"), Aberdeen, Belfast ("Ocean Traffic"), dependence is placed on the electric light for showing the canvas cones. At Penmaenmawr ("Harbour") day signals are considered sufficient. At Newquay ("Coastal"), on receipt of the warning telegram after dark, Masters and Fishermen are informed, and the cone hoisted. At Tynemouth ("Coastal") the warning telegram is placed in the look-out window, with a light behind it. At Milford Haven ("Harbour") forecast telegrams are exhibited day and night.

The assumption that canvas cones illuminated by electric light are effective for warning after dark will not be acceptable to those who have observed the distortion of objects on shore by shadows in the vicinity of a powerful light when viewed from seaward.

No Signal Station appears to be better situated than Point Lynas for exhibiting timely storm warnings when necessary to a crowd of shipping which continually passes to the westward from the Mersey, or inward toward the Mersey day and night. By the Mersey Dock and Harbour Board "It is not considered that it would be desirable to use lights at night at Point Lynas Station."

The Trinity House, the Irish Lights Office, and Lloyd's merely state that "Night Signals are not employed.

I am of opinion that lives and property might be saved annually by the adoption of a satisfactory system of signalling storm warnings after dark, and the exhibition of such signals at a number of carefully selected Stations round our coasts and in the harbours of the United Kingdom ; but especially at some of those Stations which come under the head "Coastal."

Objections may be raised against the employment of night signals on the score of interference with leading lights, or the possibility of complications arising from an addition to shore lights already numerous in places. Official notice from the Admiralty and the Board of Trade 12 months prior to a date fixed for carrying any new arrangements into effect would assist in preventing mistakes.

SIGNAL STATIONS.

Harbour Stations. (At which night signals would be seen by vessels in port, but not by those passing at sea.)

Scalloway.
Kirkwall.
Stromness.
Avoch.
Inverness.
Nairn.
Montrose.
Dundee.
Pittenweem.
Shields, S.

Harbour Stations—continued.

Hartlepool.
Whitby.
Boston. Night signals said to be wanted.
King's Lynn.
Ipswich.
Harwich.
West Mersea.
Greenhithe.
Chatham.
Sheerness.
Shellness.
Faversham.
Ramsgate.
Dover. Pleased to use N. S. if provided.
Portsmouth.
Southampton.
Cowes.
Ryde.
Poole.
Exmouth.
Plymouth.
Penzance.
St. Ives. Night Signals appear to be wanted. Vessels at anchor sometimes signal for forecasts.
Hayle.
Wadebridge. Night Signals said to be wanted. October to December.
Port Isaac. Night Signals said to be wanted. October to December.
Appledore.
Bristol. Night Signals are considered useful.
Barry.
Milford Haven. Forecast telegrams exhibited day and night.
Bangor, Penrhyn.
Preston.
Whitehaven.
Workington.
Stranraer.
Campbelltown.
Leith. Arrangements are made for night signalling.

Channel Islands.

Guernsey.
Jersey { Gorey. / St. Helier's.

Ireland.

New Ross.
Waterford.
Queenstown.
Passage.
Tralee.
Galway.
Rathmullan. N. S. wanted.
Cork.

Stations at which Night Signals are not necessary.

Edinburgh.
Berwick. Not considered necessary.
Middlesboro'. Not required; electric light
Goole. Not necessary. Information by Harbour Master.
Wisbech. No night traffic.
Grimsby Dock. Not necessary if light on coastal.
Littlehampton. Not needed.
Hamble. No night navigation.
Yarmouth, I. W.
Devonport. Night signalling arrangements to be used.
Devonport Dockyard.
Newport. Not required. May interfere with signalling apparatus.
Aberystwyth. Scarcely any traffic after dark.
Port Dinorwic. Not considered necessary.
Penmaenmawr. Day signals considered sufficient.
Greenock.

Ireland.

Newtonards.
Limerick. Not required; electric light.
Belfast. Electric light.

Coastal Stations. (At which night signals would be visible in ordinary weather to coasting vessels, and fishermen generally, but probably would not be visible to ocean-going vessels steering Channel courses.)

Lerwick. N. S. considered useful.
Wick.
Burghead.
Lossiemouth.
Buckie.
Cullen.
Portsoy.
Banff.
Fraserburgh.
Stonehaven.
Broughty Ferry.
St. Andrews. Night Signals said to be wanted.
Anstruther.
Buckhaven.
Methil.
Wemyss Castle.
Burntisland.
Bo'ness.
Dunbar. Rocket used for warning.
Eyemouth.
Cullercoats.
Redcar.
Bridlington.
Grimsby.
Sheringham.
Yarmouth.
Southwold.
Burnham.
Margate.
Sandgate. Coastguard informs seafaring people at Folkestone.
Rye. Night Signals said to be wanted.
Hastings.
Portsmouth.
Weymouth.
Teignmouth. Telegram placed in window.
Pendennis, for Falmouth.
Mevagissey.

Coastal Stations—continued.

St. Mary's, Scilly. Said not to be required.
Land's End, Sennen Cove.
Boscastle.
Briton Ferry.
Llanelly.
Burry Port.
Newquay. Masters and Fishermen informed on receipt of telegram.
Carnarvon.
Hoylake.
New Brighton.
Formby.
Lytham.
Blackpool.
Fleetwood.
Morecambe.
Walney.
Douglas.
Ramsey.
Ballantrae.
Rothesay.
Lamlash.
Carradale.
Holburn Head (Thurso).
Portknockie. Green light hoisted at night.

Ireland.

Donaghadee.
Howth.
Youghal.
Portrush.
Port Ballintrae.

Stations at which Night Signals are not necessary.

Newhaven. They use Leith.
Filey. No traffic after dark.
Cromer. Not considered necessary.
Eastbourne.
Newhaven, Sussex. Lamps provided.
Porthcawl. Not wanted.
Southport. Electric light.

Ocean Traffic.

Peterhead.
Shields, N.
Sunderland.
Flamboro' Head.
Deal.
Brighton.
Falmouth. If Pendennis not available, night signals said to be necessary.
Cardiff. Dockmaster's Office.
Penarth.
Swansea.
Holyhead.
Barrow-in-Furness.
Maryport.
Silloth.
Stornoway.
Point Lynas. Not considered advisable by Mersey Dock and Harbour Board of Liverpool.

Ireland.

Dublin.

Stations at which Night Signals are not necessary.

Aberdeen. Electric light.
Ardrossan.

336. *Storm-warnings: late arrival of telegrams.* Read—letters (M.O. 768) from Mr. E. Bryant, of Tenby, representing that the storm warning telegrams frequently arrived after the gale had commenced, and giving particulars of the time of receipt of all storm warning telegrams at Tenby from August, 1901, from which it appeared that on several occasions evening telegrams were not delivered until the following morning.

It was agreed that steps should be taken to secure improved facilities for the despatch of warning telegrams, and further consideration of the means of improving the service of storm warning telegrams was deferred to the next meeting.

337. *Logs.*—Three received; none excellent.

338. *Storm Warnings.*—None issued. No gales experienced.

339. *Forecasts.*—Read—the following letter (M.O. 809):—

M.O. 809.

Penrith.
29th April, 1902.

DEAR SIR,

THE 100 Weather Forecasts prepared at 11 a.m., between 1st January and 27th April, have been carefully checked, with the following result. In order to eliminate bias as far as possible, a description of conditions of Wind and Weather prevailing during each period was written down *before the Daily Weather Report containing the Forecast was opened.*

The total failures as regards Wind occurred on 14th January, 7th February, 19th February, 23rd February, 8th April, and 9th April.

The dates on which the Weather was totally different from the Forecasts were 8th April, 9th April, and 25th April.

—	Wind.	Weather.	Average.
Complete success	57	62	60
Partial success	37	35	36
Failure	6	3	4
Total	100	100	100

The above shows a much larger percentage of successes for England, N.W., than is usually shown by the checking made in the Meteorological Office, but the results given above apply only of course to a comparatively limited area. As a rule, they apply to an area extending from Carlisle to Appleby and from Keswick to the Cross Fell range of hills, but when it was known that at Whitehaven or other more distant places the weather agreed with the Forecasts, such occasions were put down in favour of the Office, although the weather in the immediate neighbourhood of Newton Reigny might be somewhat different.

If you have any suggestions to make for further carrying out the checking I shall be glad to receive them.

Yours faithfully,

W. N. Shaw, Esq. T. G. BENN.

340. *Harvest Forecasts.*—The usual circular (Minute 53) was approved.

341. *Reports of Work for April*:—

MARINE BRANCH.

Examined 13 new logs.

District south of the equator, between the west coast of Africa and 90° W. longitude. Preparing Ocean Charts for engraving and publication.

Sea temperature charts for Atlantic, Indian, and Pacific Oceans prepared for photo-lithography for re-issue of official publication No. 59. Copy completed and sent to lithographer.

Indian Ocean District—from latitude 30° N. to 30° S. Preparing and extracting data in Office logs.

Monthly Pilot Chart of the North Atlantic and Mediterranean—Proof of May chart examined and passed for press. June chart sent to lithographer and proof of letterpress examined. Preparing chart for July. Obtaining results of sea temperature for February, March, and April, 1902, and wind and fog results to north of 50° N. latitude for May and June. Registering and acknowledging reports of ice and sea temperature, and issuing further supplies of forms.

Sailing directions for South America—Obtaining results of meteorological observations at several places for publication in new issue.

Hydrographic extract from log of s.s. "Moravian" sent to Admiralty.

Notes of wreckage in North Atlantic entered on ice and sea temperature forms sent to Board of Trade.

Comet observations given in log of ship "County of Kinross" sent to Royal Astronomical Society.

CAMPBELL HEPWORTH.

FORECAST BRANCH.

Daily Weather Report.—All numbers issued promptly. *Monthly Correction and Addition* Sheet for March is in course of preparation (nearly complete).

Weekly Weather Report.—All numbers issued promptly, and *Monthly Summaries* for *February* issued, and *March* gone to press.

Storm Warning Checking, 1902.—Done to date.

Storm Warning Checking, 1901 (final).—Done to end of May.

Tabulation of Anemometry.—Seven months completed and handed in.

Checking of 8.30 *p.m. Forecasts.*—March in hand. April just commenced.

Times of Arrival of Foreign Telegrams.—Done *to date* and report being prepared.

Times of Arrival of several British stations (including Bath and Blacksod Point).—Done and results handed in.

Inquiries by Telegraph.—Answered—one only—(from H.M. ship "Greyhound," of Greenhithe).

Regular routine work of Branch maintained satisfactorily.

Mr. Francis has been absent owing to ill-health since the 9th, and morning remarks, &c. for the Daily Weather Report have been done by Mr. Gaster, Mr. Simpkins having been transferred to the evening "shift" temporarily.

All the Easter holidays (excepting those of Mr. Gaster) have been taken during this month, and the necessary arrangements for supply have been carried out.

FREDC. GASTER.

OBSERVATORY BRANCH.

Hourly Means.—Volume for 1899. Proof has been passed for press up to page 16, and the printer has "copy" for the next 30 pp. The calculation of the mean results for Falmouth has been completed, and the tables for Aberdeen are being copied for the printer.

Mean Temperature Tables for the British Isles.—This volume was published on the 16th April. Some time has been occupied on the examination of plates for faulty copies; and in the preparation of a specimen table for the extrapolation of mean values in certain cases for longer periods.

Examination Work.—The curves and tabulations for Valencia, January to March, 1902, have been examined, and such mean values calculated as were required for the Irish Registrar General's Return.

Tabulation of Anemograms.—The curves for all stations have been measured up to the end of May, 1901.

Miscellaneous.—Copies of Ben Nevis observations have been prepared and sent to Prof. Hergesell; and copies of the Strathpeffer sunshine record for Dr. Fox.

Relative humidity values have been computed and wind data extracted for the fog inquiry.

Some time was occupied *re* methods proposed for testing Sunshine recorders; and also upon Appendices for Annual Report.

Relative humidity values for Kew, 1901, computed for South London Gas Works Co.

Proofs have been examined of forms for aneroidograms and thermograms, and also of sunshine cards, &c.

The Holyhead anemograms have been tabulated weekly and the results sent to Dublin.

Assistance from Telegraph Branch.—Seven months' anemograms have been tabulated. Mr. Powers has been engaged in this branch every morning until noon.

R. H. CURTIS.

STATISTICAL AND LIBRARY BRANCH.

1. Issue of Publications:—

Daily and weekly publications regularly issued.

Monthly summary of the Weekly Weather Report for February, 1902, received and issued.

Pilot Charts for May, 1902, received, and 191 copies issued; also 196 copies of the charts for previous months issued to Captains and Steamship Companies.

Presentation copies of publications, 62 in all, issued to Captains and Officers of ships and others.

Temperature tables for the British Islands (O. 154) received and 180 copies issued.

2. Statistical and Station Work:—

Tables for the weekly numbers of the "Weekly Weather Report" prepared to date.

Tables and working maps for the Monthly Summary of the Weekly Weather Report for March, 1902, prepared and passed for press.

Quarterly Summary of the Weekly Weather Report, for the 1st Quarter of 1902, prepared and returned for "revise."

Results for Registrar General's (Ireland) Weekly Reports regularly supplied.

The Meteorological Table for the Registrar General's (Ireland) Quarterly Return prepared and passed for press.

Ten-day means for certain stations supplied to Dr. Neumayer, Hamburg, to date.

Mean results for temperature, rainfall, &c. for Nicosia for 1901 prepared and sent to the C.M. Officer for inclusion in the Cyprus Blue Book. Returns for other Cyprus stations in preparation.

Returns from "Stations of the Second Order" for 1899 proceeded with, and 32 pages passed for press.

3. Library :—

Accessions to library received and catalogued, as reported in "Minutes."

One hundred and ninety-eight volumes received from the binders and examined, press-marked and stored.

4. Inquiries:—

Twenty-five inquiries were dealt with during the month. Five of these inquiries were by letter, but in twenty cases personal application was made.

In 14 cases information was supplied gratis, and in 11 cases payment was made.

Mr. J. A. Curtis was absent on sick leave for three days.

JOHN A. CURTIS.

MONTHLY RETURN OF "A." AND "M.O." INSTRUMENTS ON CHARGE.

April, 1902.

—	Barometers.	Aneroids.	Thermometers. Ordinary.	Thermometers. Maximum.	Thermometers. Minimum.	Thermometers. Solar Radiation.	Thermometers. Terr. Radiation.	Screens.	Hydrometers.	Rain Gauges.	Anemometers.	Storm Cones.	Miscellaneous.
"A." ACCOUNT.													
Dr.													
On charge, 1st April, 1902	37	136	104	99	86	—	—	55	41	2	—	—	
Received since ...	21	36	7	—	3	—	—	—	—	—	—	—	
	58	172	111	99	89	—	—	55	41	2	—	—	
Cr.													
Sent out during month	6	54	4	—	—	—	—	—	—	—	—	—	
On charge, 1st May, 1902	52	118	107	99	89	—	—	55	41	2	—	—	
"M.O." ACCOUNT.													
Dr.													
On charge, 1st April, 1902	18	3	23	16	4	5	8	15	4	5	1	10	2 Sunshine Recorders. 3 Spheres. 1 Barograph. 1 Hygrograph.
Received since ...	4	—	2	—	—	—	—	2	102	—	—	—	2 Sunshine Recorders. 6 Spheres.
	22	3	25	16	4	5	8	17	106	5	1	10	
Cr.													
Sent out during month	5	—	6	2	2	1	2	6	—	1	—	—	2 Sunshine Recorders. 2 Spheres.
On charge, 1st May, 1902	17	3	19	14	2	4	6	11	106	4	1	10	2 Sunshine Recorders. 7 Spheres. 1 Barograph. 1 Hygrograph.

8th May, 1901.

R. F. WALLACE.

The Secretary was requested to report on the arrangements necessary for monthly issue of observations from Land Stations in place of annual publications.

342. *Office Staff.*—Reported—that Commissionaire T. Hill had left, and that the Commandant had sent Commissionaire J. Taylor in his place at the same salary (25*s.* per week) from 28th April.

343. Submitted—the following statement of accounts :—

	£	*s.*	*d.*
Cash balance on 24th April	4,867	11	3
Receipts from 25th April to 8th May	250	10	1
	5,118	1	4
Cheques drawn from 25th April to 8th May ...	1,032	4	10
Cash balance on 8th May	£4,085	16	6

344. *Library.*—Publications received since the last meeting :—

Bombay, Government Observatory.—Report on the condition and proceedings of the Government Observatory, Colába, for the year which ended with the 31st December, 1901.

Christiania, Norwegisches Meteorologisches Institut.—Jahrbuch . . . für 1901. Herausgegeben von H. Mohn.

Claxton, T. F.—The Mauritius drought of 1899 November—1900 December.

—— The cyclone of 1901, January 9–16.

—— The recent sunsets and sky glows.

—— The total solar eclipse at Mauritius, 1901, May 18.

Dechevrens, Marc.—Les variations passagères de la température. Causes ou effets des tourbillons atmosphériques.

Dover, John.—Report of meteorological observations [at Totland Bay, Isle of Wight] for the year 1901, with extremes and averages for preceding years. 2nd year of issue.

Gautier, R.—Observations météorologiques faites aux fortifications de Saint-Maurice. 1900.

—— Résumé météorologique . . . pour Genève et le Grand Saint-Bernard. 1900.

Hopkinson, John.—Meteorological observations taken in Hertfordshire. 1899, 1900. 2 parts.

—— Report on the rainfall in Hertfordshire in the year 1900.

Jamaica, Maxwell Hall.—Temperatures in Kingston, Jamaica, and the connexion between the sun-spot frequency, the mean max. temperature and the rainfall in Jamaica.

London, Royal Society.—Year-book of the Royal Society of London. 1902.

Maunder, E. W.—Preliminary account of the total solar eclipse of 1901, May 18, as observed at the Royal Alfred Observatory.

Mauritius, Meteorological Society.—Celebration of the Meteorological Society's Jubilee, September 16, 1901.

Mawley, Edward.—Report on phenological phenomena observed in Hertfordshire during the year 1900.

63, *Victoria Street, S.W., May 23rd*, 1902.

PRESENT:

SIR R. STRACHEY, IN THE CHAIR.

PROFESSOR DARWIN. | THE HYDROGRAPHER.

MR. SHAW (*Secretary*).

345. The Minutes of the last meeting (9th May) were read and confirmed, subject to revision of Minute 335.

346. *Dines anemometer for Falmouth* (Minute 286).—Reported—the consent of the War Office (M.O. 903) to the erection of an anemometer in Pendennis Castle and to periodical visits for inspection.

347. *Volcanic dust from Barbados.*—Reported—the presentation by Mr. Harries of a specimen of volcanic dust, forwarded by the Imperial Commissioner of Agriculture, which fell in Barbados in the night of May 7-8, 1902, and was attributed to the eruption of the Soufrière which devastated St. Vincent at that time (M.O. 964).

348. *Scottish Antarctic Expedition.*—Read—the following letter (M.O. 950) :—

M.O. 950.

Scottish Antarctic Expedition Office,
Edinburgh,
21st May, 1902.

DEAR SIR,

MR. BRUCE has requested me to write with reference to a loan of meteorological instruments for above Expedition, the plans of which have now assumed a definite shape. I enclose a list of instruments required, some of which you may be able to supply us with. I shall be in London on Saturday first and again about the middle of next week, by which time you may be able to indicate how far you can help us with a loan of instruments.

Thanking you in anticipation,
Yours faithfully,
R. C. MOSSMAN.

W. N. Shaw, Esq., F.R.S.,
Secretary,
Meteorological Office.

Pressure	1 Fortin Standard Barometer. 2 Marine „ 1 Mountain Barometer, with sling case and tripod. 6 Pocket Aneroids.
Temperature	4 Maximum Mercurial Registering Ther's. ... Scale up to 100°. 2 Spirit Maximum „ „ ... „ 50°. 6 „ Minimum ... ... 3 to −20° 3 to −80°. 1 Standard Thermometer. 4 Dry and Wet Bulb Thermometers ... ... −10° to +100°. 6 Sling Thermometers.
Radiation	3 Black Bulb in Vacuo. 4 Spirit Terrestrial Minimum.
Earth or Ice Thermometers ...	1 Earth or Ice Thermometer for depth of 3 feet. 1 „ „ „ 6 „
Rain Gauges	3 Ordinary Rain Gauges with Snowdon Rims (5 or 8 inch). 6 Glass Measures for same.
Anemometer	1 Robinson Anemometer.
Nephoscope	1 Nephoscope.
Sunshine Recorder	1 Sunshine Recorder.
Hypsometers	2 Casella's Pocket Upright Pattern. 6 spare Thermometers.

The Secretary was authorised to order for the authorities of the expedition such instruments as they wished to obtain through the office; to lend instruments free of cost to the expedition to the extent of £50, and to charge the remainder to the authorities of the expedition at cost price.

349. *Forecasts.*—Report on the Forecasts issued at 8.30 p.m. daily during April, 1902 :—

The letters used have the following signification :—
a = complete success. | c = partial failure.
b = partial (*i.e.*, more than half) success. | d = total failure.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success. a + b.
Scotland, N.	a	53	60	57	82
,,	b	27	23	25	
,,	c	13	10	11	
,,	d	7	7	7	
Scotland, E.	a	53	60	57	87
,,	b	30	30	30	
,,	c	17	10	13	
,,	d	0	0	0	
England, N.E.	a	60	70	65	89
,,	b	27	20	24	
,,	c	13	10	11	
,,	d	0	0	0	
England, E.	a	47	67	57	87
,,	b	30	30	30	
,,	c	7	3	5	
,,	d	16	0	8	
Midland Counties	a	63	70	67	89
,,	b	17	27	22	
,,	c	10	3	6	
,,	d	10	0	5	
England, S.	a	63	70	67	97
,,	b	30	30	30	
,,	c	7	0	3	
,,	d	0	0	0	
Scotland, W.	a	70	83	77	90
,,	b	20	7	13	
,,	c	3	7	5	
,,	d	7	3	5	
England, N.W.	a	63	63	63	90
,,	b	23	30	27	
,,	c	7	7	7	
,,	d	7	0	3	
England, S.W.	a	54	63	59	84
,,	b	23	27	25	
,,	c	13	7	10	
,,	d	10	3	6	
Ireland, N.	a	47	83	65	89
,,	b	30	17	24	
,,	c	17	0	8	
,,	d	6	0	3	
Ireland, S.	a	47	70	59	75
,,	b	20	13	16	
,,	c	13	10	12	
,,	d	20	7	13	
Summary.					
British Islands	a	56	69	63	87
,,	b	25	23	24	
,,	c	11	6	8	
,,	d	8	2	5	

350. *Publications — Barometer Manual.* — Read—letter (M.O. 884) from the Stationery Office, reporting that the Barometer Manual revised in 1899 was again out of print.

It was agreed that it be reprinted with any necessary corrections.

351. *Publications—Temperature Tables* (Minute 227).—Reported—the issue of a slip correcting an error in the statement of the height of the Greenwich Observatory in the volume of Temperature Tables.

352. *Instruments.*—An application from the Marine Superintendent "to issue 'A' barometers to the few observers who report breakages of 'M.O.' barometers on board their ships in ballast trim in consequence of excessive motion and vibration," was deferred for further information.

353. *Weather Telegraphy and Storm Signals* (Minutes 107, 335, and 336).—The Secretary was requested to prepare a memorandum giving particulars of the present arrangements with the Post Office for the service of weather telegraphy and of the cost of the service.

354. *Logs.*—Nine received ; three excellent.

355. *Storm Warnings* :—

Signals hoisted on 1 day, districts warned, 6.

In 4 districts the warnings were justified by subsequent strong winds or moderate gales (forces 6 and 7) but in 2 districts they were not required.

Gales experienced without warning—None.

356. *Accounts.*—Submitted—The following statement :—

	£	s.	d.
Cash balance on 8th May	4,085	16	6
Receipts from 9th to 22nd May	53	19	1
	4,139	15	7
Cheques drawn from 9th to 22nd May	286	12	10
Cash balance on 22nd May	£3,853	2	9

357. *Library.*—Publications received since the last meeting :—

Berlin, Institut für Meereskunde und Geographisches Institut an der Universität Berlin.—Veröffentlichungen. Heft 1, März, 1902. Deutsche Südpolar-Expedition auf dem Schiff "Gauss" unter Leitung von Erich von Drygalski.

Bognor Climatological Society.—Annual report and results of the observations made during the year 1901, at the Bognor Climatological Station.

Copenhagen, Dansk Meteorologisk Institut.—Nautisk-meteorologisk Aarbog. 1901.

Hann, J.—Die Schwankungen der Niederschlagsmengen in grösseren Zeiträumen.

Hastings.—Annual report of meteorological observations for the year 1901. H. Colborne, Borough Meteorologist.

Hellmann, G.—Regenkarte der Provinz Sachsen und der Thüringischen Staaten.

London, Royal Meteorological Society.—Hints to meteorological observers. Instructions for taking observations, and tables for their reduction, together with a glossary of meteorological terms. Prepared . . . by W. Marriott. 5th edition, revised and enlarged.

Lowestoft, Medical Officer.—Annual report. 1899-1901. 3 vols.

Madrid, Observatorio.—Observaciones meteorológicas efectuadas en el observatorio de Madrid durante los años 1898 y 1899.

Nicosia, Public Works Department.—Statement of rainfall recorded at six stations in Cyprus from October to March inclusive, during the years 1881-1882 to 1901-1902.

Peking, Inspectorate General of Customs.—Medical reports for the half-year ended 30th September, 1900. 60th issue.

Rugby School Natural History Society.—Report, 1901.

St. Petersburg, Université Impériale.—Travaux du Cabinet de Géographie physique de l'Université Impériale de St. Pétersbourg. Sous la rédaction du Prof. A. Woeikow. Second fascicule.

Schück, A.—Magnetische Beobachtungen an der deutschen Ostseeküste, IIa. Tafeln, auch zu magnetische Beobachtungen an der Hamburger Bucht; sowie jährliche Änderung der Elemente des Erdmagnetismus an festen Stationen Europa's i. d. Jn. 1895-1900.

Upsala, Observatoire Météorologique de l'Université.—Bulletin mensuel. 33, 1901.

Urioste, Antero.—El clima del Uruguay.

Woeikof, A.—Klima von Luktschun, Centralasien.

—— Der Luftdruck und die atmosphärische Cirkulation in Asien.

—— Platzregen und grosse tägliche Regenmengen.

—— Die Seespiegelschwankung zwischen Aralsee und Baraba und die Brücknersche Hypothese

—— Wo ist der höchste Luftdruck der Erde, mit und ohne Reduktion auf das Meeresniveau.

63, *Victoria Street, S.W., 6th June*, 1902.

PRESENT:

PROFESSOR DARWIN, IN THE CHAIR.

MR. BUCHAN. | THE HYDROGRAPHER.

MR. SHAW (*Secretary*).

358. The Minutes of the last meeting (23rd May) were read and confirmed.

359. *Registrar General's Returns.*—The Secretary reported comments on the form printed in Minute 334, from the Chairman and Sir J. W. Moore, and also from Mr. R. T. Omond forwarded by Mr. Buchan, Secretary of the Scottish Meteorological Society.

After consideration of the comments, certain modifications of the form were adopted and the Secretary was directed to inquire whether the Scottish Meteorological Society was willing to concur in recommending to the Registrars General the use of the form as revised, and in that case to inform the Registrars General for England and Wales, and for Ireland of that concurrence and to suggest the adoption of the form at the earliest convenient occasion.

360. *Fog Inquiry* (Minute 271).—Reported—the receipt of Captain Carpenter's report upon the observations.

361. *Halliwell's Self-recording Rain Gauge* (M.O. 1,055).—The Secretary reported that Mr. F. L. Halliwell, Engineer and Scientific Instrument Maker, Southport, at the suggestion of Mr. Baxendell had forwarded to the Office for inspection and trial a self-recording rain gauge showing rainfall on the scale of about nine inches of vertical trace for an inch of rain, the price of the instrument being £14, complete.

362. *Norwegian Polar Observations in* 1902–3.—Reported—the receipt of a request from M. Kr. Birkeland, leader of an expedition started by the Norwegian Government for the study of Earth Magnetism, Polar Aurora, and Cirrus Clouds, asking for co-operation in observations of Cirrus Clouds from August 1st, 1902, until June 20th, 1903.

The Secretary was directed to request the first-class observatories in connexion with the office to make observations of cirrus bands—their radiation points and breadth—during the period mentioned, as desired by M. Birkeland, and to send the reports to the office for the assistance of the Norwegian investigation.

363. *Observations from Uganda.*——Read letter (M.O. 1,024) from the Foreign Office enclosing a copy of a despatch (No. 97, Uganda) from Colonel Sadler :—

M.O. 1,024. Foreign Office,
31st May 1902.

SIR,

I AM directed by the Marquess of Lansdowne to transmit to you a copy of a despatch from His Majesty's Commissioner in Uganda inclosing various Meteorological Returns from that Protectorate.

I am to call your attention to the last paragraph of Colonel Sadler's despatch, and to inquire whether you are in a position to meet his request for 20 printed copies of the meteorological records sent home from Uganda in 1901.

I am, &c.,
(Signed) CLEMENT LL. HILL.

The Secretary,
Meteorological Office.

M.O. 1,024.
(No. 97, Uganda.)

Entebbe, Uganda,
22nd April 1902.

MY LORD,

I HAVE the honour to forward the following Meteorological Returns for your Lordship's information :—

Kisumu Lake levels and rainfall for February and March.
Entebbe, Jinja, and Wadelai Lake levels and rainfall for March.
Mumias meteorological observations for February and March.
Ankole and Gondokoro observations for February and March.
Eldama Ravine and Entebbe Observations for March.
Gondokoro and Wadelai nilometer readings for February.

If the meteorological records sent to the Foreign Office for 1901 have been embodied in a return, or printed for circulation, I would venture to request that, say, 20 copies be sent to this office for local distribution, as it frequently happens that, from want of clerical assistance, no copies are retained.

I have, &c.,
(Signed) J. HAYES SADLER.

The Marquess of Lansdowne, K.G.,
&c., &c., &c.

The Secretary was directed to reply that the question of discussing the returns from stations in Uganda and other Colonial stations with a view to periodical publication of the results was under consideration by the Council.

364. *Observations in the Estuary of the Humber* (Minute 332).—The Secretary was directed to invite Capt. Dixon to specify the form in which he proposes to record the observations in order that the Council may consider whether they can print it in a convenient shape and lend the instruments necessary for the observations.

365. *Royal Meteorological Society.*—The usual grant (Minute 80) of £25 for the inspection of stations was made on the application of the Society (M.O. 1,040) upon the same terms as last year.

366. *Logs.*—Eight received, two excellent.

367. *Storm Warnings:*—

Signals hoisted on two days, total number of districts warned, 11.

In one district the warnings were justified by subsequent gales (force 8 and upwards) and in six districts by subsequent strong winds (force 6 or 7). In four districts they were not required.

GALES EXPERIENCED, WITHOUT WARNING.

None.

368. Submitted—The following report on the Forecasts, issued at 8.30 p.m. daily, during the month of May, 1902 :—

The letters used have the following signification :

a = complete success. | c = partial failure.
b = partial (*i.e.*, more than half) success. | d = total failure.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success. a + b.
Scotland, N.	a	49	68	59	86
"	b	29	26	27	
"	c	16	6	11	
"	d	6	0	3	
Scotland, E.	a	45	61	53	89
"	b	36	36	36	
"	c	13	3	8	
"	d	6	0	3	
England, N.E.	a	39	65	52	91
"	b	52	26	39	
"	c	9	9	9	
"	d	0	0	0	
England, E.	a	52	58	55	86
"	b	35	26	31	
"	c	10	16	13	
"	d	3	0	1	
Midland Counties	a	58	61	60	89
"	b	32	26	29	
"	c	10	13	11	
"	d	0	0	0	
England, S.	a	52	55	54	88
"	b	39	29	34	
"	c	3	16	9	
"	d	6	0	3	
Scotland, W.	a	61	74	68	87
"	b	23	16	19	
"	c	10	10	10	
"	d	6	0	3	
England, N.W.	a	48	52	50	91
"	b	42	39	41	
"	c	10	9	9	
"	d	0	0	0	
England, S.W.	a	58	61	60	92
"	b	32	32	32	
"	c	3	7	5	
"	d	7	0	3	
Ireland, N.	a	55	74	65	91
"	b	32	20	26	
"	c	7	6	6	
"	d	6	0	3	
Ireland, S.	a	58	71	65	89
"	b	26	23	24	
"	c	6	6	6	
"	d	10	0	5	
Summary.					
British Islands	a	52	64	58	89
"	b	34	27	31	
"	c	9	9	9	
"	d	5	0	2	

369. *Accounts*: *Audit.*—Reported—that the cash accounts for the quarter ended the 31st March last had been this day examined by Professor Darwin and Dr. Buchan, and would be sent in due course to the Treasury for the Audit Office. The receipts from the 1st January last, when there was a balance of £2,009 18*s.* 9*d.*, were £5,452 13*s.* 1*d.* against £5,318 8*s.* 1*d* in the corresponding period of the preceding financial year. The payments were £4,997 12*s.* 3*d.* against £4,629 6*s.* 2*d.* during the same period in the previous year. The balance in hand and at the bank on the 31st March amounted to £2,464 19*s.* 7*d.*, and at the same date in 1901 to £3,122 9*s.* 1*d.*

370. *Reports of Work for May*:—

MARINE BRANCH.

5th June, 1902.

Examined 16 new logs and 2 lighthouse registers.

District south of the Equator, between the west coast of Africa and 90° W. longitude. Preparing Ocean charts for engraving and publication, also preparing notes on local features of wind and weather for African coast.

Indian Ocean District—from latitude 30° N. to 30° S. Preparing and extracting data in Office logs.

Monthly Pilot Chart of the North Atlantic and Mediterranean. Proof of June Chart examined and passed for press. July Chart sent to Lithographer and proof of black stone received. Obtaining sea temperature results for March, April, and May, and wind and fog results to north of 50° N. latitude for June and July. Registering and acknowledging reports of ice and sea temperature and issuing fresh supplies of Forms.

Sailing Directions for South America—Obtaining results of meteorological observations at several places for publication in new issue.

Mr. Carter has given assistance in Telegraph Branch from May 5th to end of month.

CAMPBELL HEPWORTH.

TELEGRAPHIC (Forecast and Storm Warning) BRANCH.

(to 31st May, 1902.)

Daily Weather Reports, 1902.—All numbers prepared promptly with corrections and additions for March and April.

Weekly Weather Report, 1902.—Charts and remarks prepared for Weekly Reports and the Monthly Summaries for March and April.

Storm Warning Checking (Primary) 1902.—Done to date.

Storm Warning Checking (Final) 1901.—Done to end of November.

Checking of Observatory Records (Bar. and Ther.).—Five Observatories, 40 readings each, and checking of Observatory Records with Standards—for month of April. Almost completed.

Preparation of Report on Times of Arrival of Foreign Telegrams Daily.—For May, half done.

Inquiries by Telegraph.—Answered 13.

Mr. Francis absent till 3rd on leave.

FREDC. GASTER.

OBSERVATORY BRANCH.

2nd June 1902.

Hourly Means, 1899.—"Copy" up to page 109 is now in the hands of the printer, and proof has been read and signed for press up to page 32. The calculation of the mean results for Kew is nearly finished, and work has been begun upon the volume for 1900.

Mean Temperature Tables.—The preparation of the tables for the extrapolation of mean values has been begun.

Tabulation of Anemograms.—The tabulation of the curves from all the extra (British) stations for 1901 has been completed to December 31.

Miscellaneous.—Copies have been made of Ben Nevis observations for Prof. Hergesell, and of Strathpeffer sun cards for April for Dr. Fox; these cards have also been tabulated weekly.

Data have been prepared and sent to Capt. Carpenter for the fog enquiry.

Inquiry has been made about methods for testing sun recorders, and visits paid to Kew Observatory and to the optician who supplies recorders to the office.

Diagram made of records of phenomena in a squall at Falmouth and Plymouth.

The barograms, &c., have been examined for evidence of airwaves due to West Indian volcanic eruptions.

Special inquiries have been made about Bournemouth sunshine records.

Inquiry.—Force of wind at Kew on two days for Fire Prevention Committee.

Examination Work.—The forecast branch has been engaged in making the 40 remeasurements, monthly, required for this work.

R. H. CURTIS.

STATISTICAL AND LIBRARY BRANCH.

1. Issue of Publications :—

Daily and weekly publications regularly issued.

Monthly Summary of the Weekly Weather Report for February, 1902, and March, 1902, received and issued.

Quarterly Summary of the Weekly Weather Report for the 1st Quarter of 1902, received and issued.

Pilot Charts for June, 1902, received, and 165 copies issued. Also 519 copies of charts for previous months issued to captains of ships and others.

Presentation copies of publications, 124 in all, issued to captains and officers of ships, and others.

2. Statistical and Station Work :—

Tables for the weekly numbers of the "Weekly Weather Report" prepared to date, and carried through the press.

Tables and maps, Nos. 1, 3, and 4, for the Monthly Summary of the Weekly Weather Report for April, 1902, prepared and passed for press.

Quarterly Summary of the Weekly Weather Report, for the 1st Quarter of 1902, revised and passed for press.

Appendix III. of the Weekly Weather Report for 1901 (Means of Temperature, Rainfall, and Sunshine, brought up to 1900) read in proof and returned for "revise."

Preface to the Weekly Weather Report for 1901, amended and returned for further "revise."

Results for six stations for Registrar General's (Ireland) Weekly Reports regularly supplied.

Ten-day means for certain stations supplied to Dr. Neumayer, Hamburg, to date.

Returns from "Stations of the Second Order" for 1899, proceeded with, and 48 pages passed for press.

Cyprus Observations. Preparation of Results for six Stations for 1901, for Cyprus Blue Book, proceeded with.

3. Library :—

Accessions to Library received and catalogued on cards, as reported in "Minutes."

24 Volumes of Foreign Daily Weather Reports prepared and listed for binding.

4. Inquiries :—

Forty-five inquiries were dealt with during May. Eight of these inquiries were by letter, but in 37 cases personal application was made. In six of the cases of personal applications payment was made for the information supplied.

Two official holidays came within the month, namely, Whit-Monday, and King's Birthday, and in addition Mr. Bracey was absent for three weeks on vacation.

Assistance given on two days in Forecast Branch in connexion with Bank Holiday.

Some time was occupied on an Experimental Form for use in the Department of Agriculture.

JOHN A. CURTIS.

MONTHLY RETURN OF "A." AND "M.O." INSTRUMENTS.

May, 1902.

—	Barometers.	Aneroids.	Thermometers. Ordinary.	Thermometers. Maximum.	Thermometers. Minimum.	Thermometers. Solar Radiation.	Thermometers. Terr. Radiation.	Screens.	Hydrometers.	Rain Gauges.	Anemometers.	Storm Cones.	Miscellaneous.
"A." ACCOUNT.													
Dr.													
On charge, 1st May, 1902	52	118	107	99	89	—	—	55	41	2	—	—	
Received since ...	1	19	18	16	30	—	—	30	—	—	—	—	
	53	137	125	115	119	—	—	83	41	2	—	—	
Cr.													
Sent out during month	16	25	30	9	11	—	—	12	—	—	—	—	
On charge, 1st June, 1902	37	112	95	106	108	—	—	71	41	2	—	—	
"M.O." ACCOUNT.													
Dr.													
On charge, 1st May, 1902	17	3	19	14	2	4	6	11	106	4	1	10	
Received since ...	15	—	148	—	—	—	—	6	9	6	—	—	
	32	3	167	14	2	4	6	17	115	10	1	10	
Cr.													
Sent out during month	14	—	15	1	1	1	1	3	34	1	—	1	
On charge, 1st June, 1902	18	3	152	13	1	3	5	14	81	9	1	9	

6th June, 1902.

R. F. WALLACE.

371. *Accounts.*—Submitted—The following statement :—

	£	*s.*	*d.*
Cash balance on 22nd May	3,853	2	9
Receipts from 23rd May to 5th June	25	1	6
	3,878	4	3
Cheques drawn from 23rd May to 5th June ...	983	17	7
Cash balance on 5th June	£2,894	6	8

372. Submitted—The following list of publications which had been received since the last meeting :—

Bjerknes, V.—Cirkulation relativ zu der Erde.

—— Bemerkung zu der vorhergehenden Abhandlung. [Ueber die Beziehung zwischen Temperatur und Luftbewegung in der Atmosphäre unter stationären Verhältnissen, von J. W. Sandström.]

Christiania, Norsk Meteorologisk Institut.—Nedböriagttagelser i Norge. Aarg. 7, 1901.

Halle, Kaiserliche Leopoldinische—Carolinische Deutsche Akademie der Naturforscher.—Geschichte der Kaiserlichen Leopoldinisch. Carolinischen Deutschen Akademie der Naturforscher während der Jahre 1852-1887 . . . . verfasst von Willi Ule.

Kodaikánal Observatory.—Report on the Kodaikánal and Madras Observatories from 1st April to 31st December 1901.

Lausanne, Institut Agricole.—Observations météorologiques faites à la station météorologique du Champ de l'Air. 1901, 15e année.

London, General Register Office.—Annual Report of the Registrar-General of Births, Deaths, and Marriages in England. 63rd, 1900.

—— *Royal Medical and Chirurgical Society.*—The climates and baths of Great Britain. Vols. 1-2.

—— *Royal Society.*—Catalogue of scientific papers. 1800-1883. Supplementary volume. Vol. 12.

Manila Central Observatory.—Magnetical dip and declination in the Philippine Islands. Brief notice of the same by Rev. John Doyle.

* *Manila, Observatorio.*—El Archipiélago Filipino. Colección de datos . . . por algunos Padres de la Misión de la Compaña de Jesús en estas Islas. Tomo 2.

Sandström, J. W.—Ueber die Beziehung zwischen Temperatur und Luftbewegung in der Atmosphäre unter stationären Verhältnissen.

—— Ueber die Beziehung zwischen Luftbewegung und Druck in der Atmosphäre unter stationären Verhältnissen.

Tebbutt, John.—Report of Mr. Tebbutt's Observatory. The Peninsula, Windsor, New South Wales, for the year 1901.

Walter, A.—On the origin and propogation of cyclonic storms.

Washington, Department of Agriculture, Weather Bureau.—Meteorological chart of the Great Lakes. 1902, No. 1.

—— —— W. B. No. 262. Bulletin J. Wind velocity and fluctuations of water level on Lake Erie. Prepared . . . by A. J. Henry.

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* Purchased.

63, *Victoria Street, S.W., 20th June*, 1902.

PRESENT:

SIR R. STRACHEY (IN THE CHAIR).

PROFESSOR DARWIN. | THE HYDROGRAPHER.

MR. SHAW (*Secretary*).

373. The minutes of the last meeting (June 6th) were read and confirmed.

374. *Observations in Uganda and East Africa* (Minute 363).—Read—letter (M.O. 1,059) from R. B. Buckley, Chief Engineer of the Bengal Irrigation department, thanking the Council for the opportunity of consulting, in the Office, the reports of the Committee of the British Association on the Climatology of Africa, suggesting the publication of a report by the Council in continuance of that prepared by the B.A. Committee, now lapsed, and also informing the Council that he believed rainfall returns would shortly be available at every forty miles, more or less, all along the Uganda Railway.

The Secretary reported that he had been in correspondence with Dr. Ravenstein with reference to the discussion of the returns forwarded by the Foreign Office (*see* Minute 110), but so far without any practical result. He also suggested that it was desirable to issue an annual publication giving a short summary of the Meteorological data received in M.S. by the Office for each year from Colonies and Dependencies, and to add to it a bibliography of Meteorological returns for the Colonies, published by the Government or by the Colonies themselves and received by the Office as published. He

further reported in view of the fact (1) that the projected five-yearly volume of Colonial observations referred to from time to time in the reports of the Council had not been commenced in consequence of the staff of the office being otherwise occupied, and (2) that a certain amount of additional work would devolve upon the Office in connexion with the preparation of the returns for the Registrar General, he did not think that the additional publication suggested to meet the requirements represented by Dr. Ravenstein (Minute 110), Colonel Sadler (Minute 363), and Mr. Buckley, could be undertaken by the Office without additional assistance.

The Secretary was requested to prepare a statement of the material available for the suggested publication and an estimate of the cost of its discussion and preparation for the press.

With regard to the additional rainfall records it was agreed that inquiry should be made as to whether forms could be supplied for copies of the observations to be returned to the Office.

375. *Arrangements with the Post Office.*—Submitted the following memorandum in compliance with Minute 353 :—

METEOROLOGICAL OFFICE.

MEMORANDUM ON THE EXISTING ARRANGEMENTS FOR WEATHER TELEGRAPHY.

In pursuance of the terms of the Treasury Minute under which the Meteorological Council was constituted, the Council, in co-operation with the meteorological establishments of the Governments of France, Spain, Portugal, Germany, Sweden and Norway, Holland and Belgium, maintain a service of weather telegraphy on account of which the grant at the disposal of the Council is charged to the extent of about £3,500 per annum. The whole cost of the service amounts to about £4,800 per annum, but about £1,300 is reimbursed to the Council by persons to whom certain special services are rendered.

The £4,800 is made up approximately as follows :—

	£	
For the payment of observers	550	per annum.
For instruments and sundries	140	„
Inspections	200	„
Postage	250	„
Postal telegraphic expenses	1,810	„
Continental Meteorological Offices for certain foreign telegrams	120	„
Salaries and expenses of office staff for the preparation and distribution of reports and forecasts	1,730	„
	£4,800	„

The services to the public, represented by this expenditure of public money, are as follows :—

(1.) The preparation of daily and weekly weather reports and the issue of these reports as received from the printers to H.M. Stationery Office.

(2.) The issue, free of charge, of daily and weekly information to newspapers and press agencies, upon which nearly the whole of the weather information reported in the public press of the United Kingdom is based.

(3.) The issue of forecasts by telegraph to public bodies and private persons upon a certain scale of payment.

(4.) The issue of storm warnings by telegraph, as occasion arises, to 233 stations on the coasts of the United Kingdom.

With regard to the expenditure upon this service it will be noticed that more than one-third of the whole sum is paid to the Post Office for services rendered. The details of a large part of the expenditure are therefore not under the control of the Council. In this matter they can only avail themselves of the facilities which are afforded to the general public with the scale of charges detailed in the Telegraphic Regulations as set forth in pp. 519 to 537 of the Post Office Guide for April, 1902. Within these regulations the officials of the Post Office afford the Council all possible assistance, but the regulations are not entirely appropriate to the special circumstances of the service of weather telegrams.

The points upon which some modification seems desirable in the public interest have reference to (1) the facilities for the transmission and delivery of storm warning telegrams and (2) the cost of services outside the usual hours of attendance at rural post offices :—

(1.) With regard to the storm warning telegrams it should be pointed out that, as a rule, the earliest trustworthy indication of the approach of a dangerous storm to the coasts of the British Isles precedes the storm by only a few hours. There is no immediate prospect that improvement in methods of telegraphy or the advance of meteorological science will substantially increase the interval, although they may materially assist in making the indications more precise and the warnings more exact and detailed. In the meantime, by improvements in detail, the efficiency of the system may be increased. It is primarily most desirable in the interests of this service, which has for its object the prevention of avoidable loss of life and destruction of property at sea, that no delay should occur in the transmission and delivery of the telegrams which are an essential part of the service. Under

the present arrangements delays of a serious character are specially liable to occur with warnings sent out from the office upon the receipt of evening telegrams reporting observations made at 6 p.m. These evening warnings are despatched at 7.30 p.m. or thereabout, and as the signal stations are in very remote districts the telegrams may fail to be delivered the same night and not reach their destination till after 8 a.m. the next morning (14 hours after the observations upon which the warnings are based) on account of the terminal office being closed a few minutes before the arrival of the telegrams. There is no material in the office to show how frequently this delay occurs in actual practice as we have no official return of the time of delivery, but from Mr. Bryant's report for Tenby it appears that evening telegrams were not delivered there until the following morning on six occasions out of eleven in the past winter.

It seems almost inevitable that delay of the kind indicated should occur at nearly all stations in the case of warnings sent on Sundays.

There are two ways of avoiding such delays or at least of reducing their number. One is to adopt an earlier hour for evening observations and the other to make use of the Post Office regulations for late fees, and have the telegrams delivered after hours, "if the attention of the terminal office can be gained," and to pay the charges authorised by the Post Office in such cases. Neither of these alternatives can be regarded as satisfactory. The interval between the evening observations at 6 p.m. and those of the following morning at 8 a.m. is already too long and ought certainly to be reduced, and, on the second alternative, there is no real security for the delivery of the messages even if the Council were prepared to meet the additional expense. The telegrams would in no case arrive many minutes after office hours and, in view of the purpose for which they are intended, it seems not unreasonable to ask that they should receive special consideration, that they should be entitled to priority of transmission and be delivered the same night or returned to the office as undelivered for a stated reason.

(2.) The second consideration is with reference to the expense of Post Office services out of usual office hours. These charges are made under regulations numbered 26 to 29 in the Post Office Guide, by which an extra charge of 1*s.* may be made for transmitting or receiving each message. The scale of charges has been considerably reduced in recent years, but under the present regulations the Council pay about £66 per annum for attendances on Sundays. For certain reasons which need not be detailed here, it would largely increase the efficiency of the service if the morning hour of observation were fixed at 7 a.m. instead of 8 a.m., and telegrams reporting the observations dispatched between 7.15 and 7.30 a.m. As the hours of attendance at Post Offices are regulated in the public interest, it would seem to be not unreasonable that, if it is judged desirable to maintain at the public expense a service of weather telegraphy, the Post Offices should be open without special charges to give facilities for the transmission of the telegrams, which form an essential part of that service, at such hours as the efficiency of the service may require. At present the Council is liable to have to pay 1*s.* or even 2*s.* additional charge for each message transmitted before 8 a.m. The charge of 1*s.* for the accommodation of having the Post Office opened on a special occasion of rare occurrence, which may be any time between 8 p.m. and 8 a.m., if the official can be aroused, is no doubt appropriate, but its application to a regular service amounting, for example, to such a sum as £18 4*s.* a year extra, as now paid for a daily message handed in at Cahirciveen or £36 8*s.* a year for a similar service at Blacksod—half an hour before the usual time of opening the office there—seems to be an unnecessarily large charge.

When the charges made by the Post Office are under consideration it may fairly be remarked that the charge of £1 1*s.* per annum for registering an abbreviated address, although a small one, ought not to be enforced against a department created by the Government in the public interest; for when telegrams are sent every day from 25 stations, so distributed that all the main lines must be traversed, a single letter, or two letters, might suffice to identify the destination, especially as for the most part the telegrams are of such a character that their destination is apparent without any address at all.

Also the charge for maintaining a private wire and instruments might be avoided or reduced by an understanding with the Post Office. The use of a private wire is no doubt an advantage for the Office in so far as it economises time, but as regards expense the Post Office has the advantage, for the cost of delivery of the messages—which is paid for by the charge at inland rates—is avoided and the Council has, on the other hand, to provide the service of a telegraphist to take off the messages. There seems no reason, on public grounds, why an arrangement should not be come to whereby the Meteorological Office and a public Telegraph Office should be accommodated in the same building, the public office making use of the ground floor.

It appears, therefore, that without infringing the principle that the Council should pay for its telegraphic service at the usual inland rates, the efficiency of the system of weather telegraphy might be largely improved, without much additional cost, if the following propositions could be accepted by the Postmaster-General.

1. Storm warning telegrams to have priority of transmission, and to be delivered on the day of issue, or returned to the Office with the reason for non-delivery stated.
2. The Telegraph Offices required for the transmission of weather telegrams for the public service to be open, without extra charge, at such hours as the efficiency of the service may require, the appropriate hours being arranged in consultation with the Postmaster-General.
3. The telegraphic address of the office to be registered or otherwise arranged for without charge.
4. An arrangement to be made for the accommodation of a public Telegraph Office in the same building as the Meteorological Office, and for the Post Office to undertake the duty of receiving the weather telegrams for a special consideration to be agreed upon.

I append (1) an analysis of the monthly accounts payable to the Post Office in the year ended March 31st, 1902.

(2) A short statement of the estimated annual charges represented (in the particular year mentioned) by the preceding analysis.

1. Analysis of the Accounts between the Meteorological Office and the Post Office for the twelve months ended March 31, 1902.

£ s. d.		1. Registration of Address.	2. Maintenance of Private Wires and Instruments.	3. Daily Telegrams from British Stations.	4. Daily Telegrams sent Abroad.	4. Compilation Charge.	5. Storm Warning Telegrams.	6. Sundry Messages, &c.	7. Telegraph Clerks' Allowances, &c.	8. Harvest and other Forecasts.	9. Credit for Forecast Inquiry Fees.
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
126 18 4	April 1901	1 1 0	15 5 0	37 8 8	42 3 4	—	25 17 0	2 6 9	—	3 14 7	0 18 0
146 17 0	May „	—	—	37 4 2	41 4 3	—	8 5 0	0 10 7	51 12 6	8 8 6	0 8 0
135 7 10	June „	—	—	40 5 11	40 13 9	12 10 0	19 4 9	9 16 7	—	4 3 6 9 5 4	0 12 0
160 4 5	July „	—	—	41 17 2	45 11 2	—	—	10 3 8	42 15 2	3 3 1 16 14 2	—
127 14 7	August „	—	—	42 2 7	45 7 8	—	12 17 3	10 10 10	—	3 1 1 14 8 2	0 13 0
150 9 11½	September „	—	—	41 5 9	44 4 11	12 10 0	33 15 1½	9 19 2	—	5 4 10½ 4 17 1½	1 7 0
196 16 1	October „	—	—	39 3 1	44 16 6	—	18 10 8	34 14 7 (L'pool Jl. Com.) 10 10 11	45 5 6	4 0 10	0 6 0
128 4 3	November „	—	—	37 5 9	42 19 5	—	27 14 3	6 7 6 10 8 1	—	3 17 3	0 8 0
181 9 6	December „	—	—	41 12 1	45 16 7	12 10 0	59 17 6	6 7 1 15 13 9	—	—	0 7 6
197 1 1	January 1902	—	—	39 10 10	45 12 6	—	44 19 0	6 12 1 11 3 6	44 17 0	4 11 8	0 5 6
158 14 4	February „	—	36 12 6	35 6 10	40 4 6	—	27 6 4	5 18 4 9 13 5	—	3 15 5	0 3 0
171 10 11	March „	—	14 12 6	40 12 3	46 1 2	12 10 0	37 0 3	6 7 1 10 14 4	—	3 18 4	0 5 0
1,881 8 3½		1 1 0	66 10 0	473 15 1	524 15 9	50 0 0	315 7 1½	177 18 3	184 10 2	93 3 11	5 13 0

[1903

The estimated annual charges may be summarised, based on the foregoing account, as follows :—

	£
1. For the registration of the address "Weather London"	1
2. For the maintenance and use of a private wire £36 12*s.* 6*d.* and the telegraphic instruments at the Office £14 12*s.* 6*d.*	51
Ditto private wire at Valencia	15
3. For daily telegrams from British stations to the Office charged for at the usual inland rates of ½*d.* per word or group of five figures, including the address with a minimum charge of 6*d.* for each telegram.	474
4.*For daily telegrams to Continental Weather Offices charged for at various rates.	525
5. For occasional storm warning telegrams, generally to a selection of the 233 storm signal stations charged for at the rate of 6*d.* or more per telegram for each station to which a message is sent. For 22 of the stations a second copy of the message is delivered to a second address at a terminal station at a charge of 2*d.* per repetition.	315
6.*For the compilation in the Central Telegraph Office of foreign telegrams from the separate telegrams by special arrangement.	50
7. Late fees under Regulations 26–29 to Post Office clerks for opening offices on Sunday to transmit ordinary messages and similar services.	66
8. For remuneration of Post Office clerks who act as observers at Leith, N. Shields, and Roche's Point.	47
9.*For payments to Post Office clerks for opening telegraph offices out of hours for 7 a.m. telegrams for the German and Dutch services under the regulations for late fees (26–29). [For Blacksod (in accordance with regulation) £36 8*s.*] ... [„ Cahirciveen „ „ £18 4*s.*] ...	62
10.*For telegraphic Forecasts (the cost of which is as a rule reimbursed to the office by the recipients) charged at inland rates.	93
11. For telegrams on office business repetitions, etc. at ordinary inland rates and compilation charges for telegrams to provincial newspaper offices (66–68).	178
	£1,877

376. *Registrar General's Meteorological Returns.*—After discussion it was resolved to postpone the definitive reply to the Registrar General's letter of 25th March, 1902 (Minute 283), until further information had been obtained as to the details of the work involved in the preparation of the returns, and it was agreed in the meantime that the preparation of a quarterly return for the quarter ending June 30th from the returns forwarded to the Office by the Registrar General be proceeded with.

377. *Instruments.*—Submitted—The following :—

RETURN of ADMIRALTY INSTRUMENTS in the OFFICE and at HIS MAJESTY'S DOCKYARDS, for QUARTER ending March 31st, 1902.

Place and Date.	Particulars.	Barometers.		Thermometers.			
		Mercurial.	Aneroid.	Ordinary.	Max.	Min.	Screens.
Meteorological Office.	Available 1st Jan., 1902	66	177	315	86	72	44
	Received, new	6	19	—	13	7	30
	„ repaired and cleaned.	15	23	—	—	—	4
	Total	87	219	315	99	79	74
	Issued	24	74	254	39	35	21
	Total available 1st Apr., 1902	63	145	61	60	44	53

* The office is partly or wholly reimbursed for the expenditure under these heads.

Return of Admiralty Instruments for the Quarter ending 31st March, 1902.

Depôts.	Barometers.								Thermometers.															
	Mercurial.				Aneroid.				Ordinary.				Maximum.				Minimum.				Screens.			
	Est.	Store.	Surplus.	Shortage.	Est.	Store.	Surplus.	Shortage.	Est.	Store.	Surplus.	Shortage.	Est.	Store.	Surplus.	Shortage.	Est.	Store.	Surplus.	Shortage.	Est.	Store.	Surplus.	Shortage.
Portsmouth	25	26	1	—	55	53	—	2	150	160	10	—	50	54	4	—	50	56	6	—	25	16	—	9
Devonport	25	20	—	5*	55	46	—	9*	150	139	—	11*	50	53	3	—	50	45	—	5*	22	22	—	—
Chatham	25	21	—	4*	55	46	—	9*	150	144	—	6*	50	41	—	9*	50	45	—	5*	25	12	—	13*
Sheerness	6	4	—	2	15	16	1	—	30	30	—	—	10	11	1	—	10	12	2	—	10	8	—	2
Queenstown	2	2	—	—	2	4	2	—	3	12	9	—	3	8	5	—	3	8	5	—	—	3	3	—
(Dockyards Home) Total	83	73	1	11	182	165	3	20	483	485	19	17	163	167	13	9	163	166	13	10	82	61	3	24
Gibraltar	2	2	—	—	2	2	—	—	4	8	4	—	3	3	—	—	3	3	—	—	—	—	—	—
Malta	11	15	4	—	15	16	1	—	60	53	—	7	10	12	2	—	10	10	—	—	1	2	1	—
Bombay	4	4	—	—	3	1	—	2	10	—	—	10	4	3	—	1	4	3	—	1	1	2	1	—
Halifax	3	3	—	—	4	1	—	3	20	19	—	1	4	1	—	3	4	1	—	3	1	2	1	—
Bermuda	3	4	1	—	4	5	1	—	20	16	—	4	4	4	—	—	4	5	1	—	1	2	1	—
Jamaica	3	3	—	—	2	4	2	—	10	10	—	—	2	—	—	2	2	1	—	1	1	1	—	—
Cape of Good Hope	7	3	—	4	8	6	—	2	33	28	—	5	8	10	2	—	8	6	—	2	2	2	—	—
Trincomalee	3	2	—	1	3	2	—	1	10	17	7	—	4	5	1	—	4	4	—	—	1	1	—	—
Hong Kong	17	11	—	6	21	15	—	6	87	71	—	16	21	7	—	14	21	15	—	6	5	12	7	—
Coquimbo	2	1	—	1	4	3	—	1	15	11	—	4	2	3	1	—	2	4	2	—	1	1	—	—
Sydney	5	2	—	3	6	8	2	—	25	13	—	12	6	3	—	3	6	3	—	3	1	1	—	—
Esquimalt	4	3	—	1	5	8	3	—	15	20	5	—	2	2	—	—	2	3	1	—	1	2	1	—
(Dockyards Abroad) Total	64	53	5	16	77	71	9	15	309	266	16	59	70	53	6	23	70	58	4	16	16	28	12	—
Grand Total and Net Shortage at Depôts	147	126	—	21	259	236	—	23	792	751	—	41	233	220	—	13	233	224	—	9	98	89	—	9
Meteorological Office... ...	45	63	18	—	120	145	25	—	250	61	—	189	80	60	—	20	80	44	—	36	50	53	3	—
Repairing	—	—	14	—	—	—	21	—	—	—	17	—	—	—	—	—	—	—	—	—	—	—	—	—
Returnable from Depôts ...	—	—	20	—	—	—	13	—	—	—	2	—	—	—	—	—	—	—	1	—	—	—	—	—
Ordered	—	—	14	—	—	—	—	—	—	—	144	—	—	—	16	—	—	—	30	—	—	—	—	—
Net Surplus or Shortage at M.O.	—	—	66	—	—	—	59	—	—	—	—	26	—	—	—	4	—	—	—	5	—	—	3	—
Proposed to be Ordered ...	—	—	—	—	—	—	—	—	—	—	108	—	—	—	20	—	—	—	20	—	—	—	10	—

15th June, 1902

* Supplies forwarded since 31st March, 1902.

R. F. Wallace.

378. *London Fog Inquiry* (Minute 360).—The Secretary was requested to draft a letter to the County Council to report the steps taken in pursuance of the conditions laid down by the County Council in making the grant of £250 (Minute 106), and to ask whether the Council were prepared to supplement the grant with a view to the continuance of the inquiry in the coming winter.

379. *Antarctic Expedition.*—(1) Submitted—the following memorandum in compliance with the resolution of Minute 313 :—

The observations appear to have been taken carefully and recorded faithfully but in copying from the Rough Book into the Register some mistakes have occurred.

Barometer, Dry and Wet Bulbs, Sea Temperature, and Wind Observations are excellent.

Cloud Observations are sometimes difficult to interpret, especially those noted prior to 26th August.

Ship's position is noted each day but it is not stated whether by observation or by dead reckoning.

Currents are not given and cannot be calculated from the data available.

Evaporation tests are novel.

C. H.

(2) It was resolved to supply the S.Y. "Morning," the relief ship of the Expedition, with the usual outfit of instruments in return for a copy of the observations (M.O. 1,089).

380. *Logs.*—Six received, one excellent.

381. *Storm Warnings* :—

Signals hoisted on two days, total number of districts warned eight.

In four districts the warnings were justified by subsequent strong winds (forces 6 or 7). In four districts they were not required.

GALES EXPERIENCED, WITHOUT WARNING.

None.

382. *Accounts.*—Submitted—The following statement of accounts :—

	£	s.	d.
Cash balance on 5th June	2,894	6	8
Receipts from 6th to 19th June	85	12	8
	2,979	19	4
Cheques drawn from 6th to 19th June	104	10	5
Cash balance on 19th June	£2,875	8	11

383. *Library.*—Publications received since the last meeting :—

Blackpool, Public Health Office.—Annual report of the Medical Officer of Health. 1901.

Chemnitz, K. Sächsisches Meteorologisches Institut.—Jahrbuch . . . für das Jahr 1898. Jahrg. 16 der neuen Reihe. Zugleich Deutsches meteorologisches Jahrbuch für 1898. Beobachtungssystem des Königreiches Sachsen.

Coventry, Medical Officer of Health.—Annual report on the health of the city, by E. H. Snell. 1901.

Greenwich, Royal Observatory.—Report of the Astronomer Royal to the Board of Visitors . . . read . . . 1902, June 7.

Llinás, Observatorio Belloch.—Hojas meteorológicas. 1901.

London, Admiralty, Hydrographic Department.—Wind charts for the coastal regions of South America.

Perrot, F. L.—Sur un coucher de soleil remarquable, observé à Genève le 1er février 1902.

Wilson-Barker, D.—Clouds and weather signs.

63, *Victoria Street, S.W., 4th July*, 1902.

PRESENT:

SIR R. STRACHEY, IN THE CHAIR.

MR. BUCHAN.	THE HYDROGRAPHER.
PROFESSOR DARWIN.	MR. SHAW, *Secretary*.

384. The Minutes of the last meeting (20th June) were read and confirmed.

385. *Annual Report.*—A proof of the introductory portion of the report and of a number of the Appendices was submitted and ordered to be circulated among the members of the Council.

386. *Observations at Stations in Colonies and Dependencies* (Minute 374).—Submitted—The following memoranda on the MS. returns for 1901, and printed reports of observations preserved in the Office :—

RETURNS FROM FOREIGN AND COLONIAL STATIONS.

The Office is now receiving manuscript returns from 59 Foreign and Colonial Stations as follows :—

Bahamas	... 5 Lighthouse registers. (Commencing at various dates from 1858 to 1889.) 1 3rd Order.
Barbados	... 1 Monthly Summary from 1895.
Beyrout	... 1 Normal 2nd Order (1884).
Brazil (Cuzabá)	... Monthly Summary (1901).
British Guiana	... Daily Sunshine and Normal 2nd Order (1887).
[Cyprus	... 6 Normal 2nd Order—(1881) published.]
East Africa	... 10 Stations, various.
Eastern Soudan	... 2nd Order.
Falkland Islands	... Lighthouse register (1860).
Gibraltar	... 2nd Order (1887).
Gold Coast	... 8 Stations, 3rd Order (with gaps) (1896).
Isthmus of Panama ...	... 2nd Order (with gaps) (1898).
Lagos	... 2nd Order (imperfect) (1891).
Madagascar (Mojanga) ...	... Normal 2nd Order (1892).
Mauritius	... Monthly Summary (1901).
St. Helena	... 2nd Order, anemometer, and 3 rainfall stations (1892).
Sierra Leone	... 2nd Order (1896).
Sombrero	... Lighthouse register (1867).
South Pacific (Malden Island)	... 2nd Order (1890).
Tangier (Cape Spartel) ...	... Normal 2nd Order (1893).
Teneriffe	... Normal 2nd Order (1889).
Uganda	... 8 Stations, various.
West Africa (Old Calabar)	... 2nd Order (imperfect) (1898).

In the majority of cases these returns reach us monthly, but at 7 stations the "Lighthouse Register" is kept, and these registers are sent in at the end of each six months. Returns for about 60 stations are available for 1901 or previous years.

The amount of information varies a good deal. At some stations Normal Climatological Returns (Second Order, according to the International classification) have been kept, while at others only the daily rainfall has been observed. At the lighthouse stations three or four sets of observations are taken daily. Roughly speaking, the returns may be summarised as 7 Lighthouse registers, 22 Second Order Stations, 30 Third Order and Rainfall Stations.

I estimate that the work involved in the systematic examination of these various Returns, the checking of the observations as far as is possible, the verification of the reductions where already worked, and the reduction of the readings to the normal where required, the preparation of Monthly and Annual Summaries, and the passing of a volume containing the results for a year through the press, together with the compilation of an annual statement showing, in sufficiently full detail, the data to be found in print in the Office Library relating to the Meteorology of Foreign Countries and of the British Colonies, would occupy two clerks for about one-third of their time.

As regards the size of the annual volume containing the information referred to above, I estimate that the results of the observations would occupy 26 4to pages, allowing 4 pages for Introduction, &c., and that the bibliographical return would fill, according to the amount of detail given, from 6 to 14 pages in addition, or in all, at the most, 40 pages.

J. A. C.

List of printed Meteorological Observations now being received in the Library of the Meteorological Office from British Colonies and British Protectorates :—

NORTH AMERICAN.

Canada.

1. General meteorological register of the Magnetical Observatory, Toronto.
2. Monthly weather review.
3. Report of the Meteorological Service.
4. Daily Weather Maps.
5. Monthly do.
6. A monthly abstract of observations is published in "Symons' Magazine."

Newfoundland.

1. Nil.*
2. Monthly Weather Review. Dominion of Canada.

AUSTRALASIAN.

British New Guinea.

1. "Annual report on British New Guinea" contains occasional observations.

Fiji.

1. Meteorological observations at Suva. By J. D. W. Vaughan.

New South Wales.

1. Results of rain, river, and evaporation observations made in New South Wales.
2. Daily Weather Charts.

New Zealand.

1. Monthly rainfall.
2. Meteorological observations at Wellington. By R. B. Gore.
3. Meteorological observations in New Zealand.
4. Monthly abstracts for Auckland and Wellington in "Symons' Magazine."

Queensland.

1. Daily Weather Maps.

South Australia.

1. Meteorological observations made at the Adelaide Observatory, and other places in South Australia and the Northern Territory.
2. Rainfall in South Australia and the Northern Territory.
3. Monthly abstracts for Adelaide in "Symons' Magazine."

Tasmania.

1. Report of the Government Meteorologist.

Victoria.

1. Record of results of observations . . . made at the Melbourne Observatory, and at other localities in the Colony of Victoria.
2. Monthly abstracts for Melbourne in "Symons' Magazine."

Western Australia.

1. Meteorological observations at the Perth Observatory and other places in Western Australia.
2. The climate of Western Australia. (Monthly.)
3. Rainfall. (Monthly.)

WEST INDIAN.

Bahama Islands.

1. Meteorological observations at Nassau. (Bahamas Blue Book.)

Bermuda Islands.

1. Report of the Registrar General.
2. Monthly abstracts of observations in "Army Medical Department Report."
3. Monthly Weather Review. Dominion of Canada.
4. U.S.A. Weather Map. (Occasional observations.)

Barbados.

1. Nil.
2. Monthly abstract of observations in "Army Medical Department Report."
3. U.S.A. Weather Map. (Occasional observations.)

British Guiana.

1. Meteorological observations taken at the Botanic Gardens, Georgetown.
2. Report on the Botanic Gardens and their work.

British Honduras.

1. Meteorological observations at the Public Hospital, Belize.

Jamaica.

1. Weather Report.
2. Monthly abstract of observations at two stations in "Army Medical Department Report."
3. Monthly abstract for Kingston in "United States Monthly Weather Review."
4. U.S.A. Weather Map. (Occasional observations.)

* Nil is stated in cases where observations are not received direct from the Colony.

Leeward Islands, Antigua.

1. Meteorological register kept at the Government Laboratory, St. John's.

Leeward Islands, Dominica.

1. Nil.
2. Monthly abstract for Roseau in "United States Monthly Weather Review."
3. U.S.A. Weather Map. (Occasional observations.)

Leeward Islands, St. Christopher and Nevis.

1. Nil.
2. Monthly abstract for Basseterre in "United States Monthly Weather Review."
3 U.S.A. Weather Map. (Occasional observations.)

Leeward Islands, Montserrat.

Nil.

Leeward Islands, Virgin Islands.

Nil.

Windward Islands, Grenada.

1. Meteorological report, Richmond Hill Observatory.
2. Monthly abstract in "Symons' Magazine."

Windward Islands, St. Lucia.

1. Meteorological observations. (Annual Summary.)
2. Synopsis of meteorological return.
3. Monthly abstract of observations in "Army Medical Department Report."

Windward Islands, St. Vincent.

Nil.

Tobago.

Nil.

Trinidad.

1. Meteorological return of observations at Royal Botanic Gardens.
2. Monthly abstract in "Symons' Magazine."
3. Do. in "United States Monthly Weather Review."
4. U.S.A. Weather Map. (Occasional observations.)

Turks and Caicos Islands.

1. Nil.
2. Monthly abstract for Grand Turk in "United States Monthly Weather Review."
3. U.S.A. Weather Map. (Occasional observations.)

AFRICAN.

Cape of Good Hope.

1. Report of the Meteorological Commission, Cape Town.
2. Monthly abstract for Cape Town in "Symons' Magazine."

Basutoland.

1. Nil.
2. Report of the Meteorological Commission, Cape Town.

Gambia.

1. Comparative rainfall and meteorological observations.

Gold Coast.

Nil.

Lagos.

1. Occasional observations in the "Government Gazette."
2. Monthly abstract in "Symons' Magazine."

Natal.

1. Report of the Government Astronomer, Natal Observatory.
2. Monthly abstract for Fort Napier in "Army Medical Department Report."
3. Report of the Meteorological Commission, Cape Town.

St. Helena.

Nil.

Sierra Leone.

1. Nil.
2. Monthly abstract in "Army Medical Department Report."

Transvaal and Orange River.

1. Nil.
2. Report of the Meteorological Commission, Cape Town.

Zululand.

Nil.

MEDITERRANEAN.

Cyprus.

1. Meteorological observations in the "Cyprus Blue Book."
2. Rainfall observations in the "Government Gazette."
3. Monthly abstract for two stations in "Army Medical Department Report"

Gibraltar.

1. Nil.
2. Monthly abstract in "Army Medical Department Report."

Malta.

1. Nil.
2. Monthly abstracts in "Army Medical Department Report" and "Symons' Magazine."

EASTERN.

Ceylon.

1. Report on the meteorology of Ceylon. Published by the Surveyor-General's Office.
2. Results of meteorological observations. (Monthly.)
3. Monthly abstract in "Symons' Magazine."
4. The Indian Weather Review.

Hong-Kong.

1. Observations and researches. Published by Hong Kong Observatory.
2. Extract of meteorological observations made at the Hong Kong Observatory.
3. China coast meteorological register.
4. Monthly abstract in "Army Medical Department Report."

Labuan.

Nil.

Mauritius.

1. Results of the magnetical and meteorological observations made at the Royal Alfred Observatory.
2. Annual report of the Royal Alfred Observatory.
3. Monthly abstract in "Symons' Magazine."
4. The Indian Weather Review.

Seychelles Islands.

1. Nil.
2. The Indian Weather Review.

Straits Settlements.

1. Annual meteorological report, Straits Settlements.
2. Monthly abstract in "Army Medical Department Report."

MISCELLANEOUS.

Falkland Islands.

Nil.

Monthly means of temperature and rainfall for all the preceding Colonies, with the exception of Virgin Islands, Tobago, Basutoland, Zululand, Seychelles, and Falkland Islands, are published in "Statistical Tables relating to the Colonial and other Possessions of the United Kingdom." (See Part xxiii., 1897–98.)

BRITISH POSSESSIONS AND PROTECTORATES.

Aden.

1. Indian Weather Review.

Ascension.

Nil.

Bechuanaland.

1. Nil.
2. Report of the Meteorological Commission, Cape Town.

British Central Africa.

1. Climatology of Africa. (British Association's Report.)
2. Meteorological observations at Zomba. ("Central Africa British Gazette.")
3. Barograph hourly values for Zomba.

British East Africa.

1. Climatology of Africa. (British Association's Report.)

British South Africa.

1. Rainfall at Salisbury. ("Statistical Tables relating to the Colonial and other Possessions of the United Kingdom.")

British North Borneo.

Nil.

Cyprus.
See "Mediterranean," page 44.

MALAY, PROTECTED STATES.

Perak, Selangor, Negri Sembilan, Pahang.

1. Monthly abstracts of temperature and rainfall. ("Statistical Tables relating to the Colonial and other Possessions of the United Kingdom.")
2. Monthly abstract of observations at Taiping. ("Perak Government Gazette.")

Niger Protectorate.

1. Observations at Old Calabar in "Climatology of Africa." (British Association Report.)
2. Monthly abstract of temperature and rainfall at Old Calabar. ("Statistical Tables relating to the Colonial and other Possessions of the United Kingdom.")

Sarawak.
Nil.

Tristan d'Acunha.
Nil.

WESTERN PACIFIC.

Cook or Hervey Islands.
Nil.

Melanesia.
Nil.

New Hebrides.
Nil.

Samoa or Navigator's Islands.
Nil.

Solomon Islands.
Nil.

Tongan or Friendly Islands.
Nil.

The Secretary was directed to draft a letter asking the Colonial Office to defray the cost of reducing the observations and preparing for press an annual volume of colonial or foreign observations, including, as far as possible in the first volume, mean values for five years, with a short bibliography of the existing meteorological publications of the Colonies.

387. *Arrangements with the Post Office* (Minute 375).—It was resolved to postpone further action in connexion with the Post Office arrangements with regard to the improvement of the telegraphic weather service and storm signal service.

It was also resolved that in consequence of the continued unpunctuality of the telegraphic reports from Aberdeen, Mr. Buchan be requested to arrange for a new observer at Aberdeen, and to transfer the telegraphic reporting station to him with the understanding that the station should commence reporting 7 a.m. observations, which could be forwarded to Hamburg in compliance with the request of the Seewarte (*see* Minute 16, Jan. 30, 1901), and that the 8 a.m. readings should be sent to the Office as additional observations until the system of observing at 7 a.m. could be made general.

388. *London Fog Inquiry* (Minute 378).—The Secretary reported that Captain Carpenter's report had not yet been returned to the Office. He was authorised to inform the County Council that the balance of the sum of £250 unexpended would be available for the commencement of observations in the coming winter, but that an additional grant would be required to carry the observations forward through the whole of the winter.

389. *International Co-operation for Balloon Ascents.*—Submitted—The following correspondence (M.O. 1,208, and M.O. 1,220) :—

M.O. 1208.

Internationale Kommission für wissenschaftliche Luftschiffahrt.
Strassburg i. E., den 26. Juni 1902.

HOCHGEEHRTER HERR KOLLEGE!

IN der Anlage beehre ich mich, Ihnen eine Resolution, die von der Berliner Conferenz der internationalen Kommission für wissenschaftliche Luftschiffahrt einstimmig angenommen worden ist, mit der Bitte ganz ergebenst zu übersenden, die Erfüllung der in derselben ausgesprochenen Wünsche, wenn irgend wie möglich, ins Werk zu setzen.

Ich füge hinzu, dass diese Resolution dem Herrn Reichskanzler des Deutschen Reiches übersandt worden ist mit der Bitte, dieselbe der englischen Regierung auf diplomatischem Wege übermitteln zu wollen.

Mit dem Ausdrucke meiner grössten Hochachtung,

H. HERGESELL.

Mr. Shaw, Meteorological Office, London.

M.O. 1208.

RESOLUTION 8.

THE International Committee for Scientific Aeronautics think that the co-operation of the British and Indian Governments in the exploration of the upper atmosphere by the means of balloons and kites, more particularly within the tropics, forms a most important part of their work.

Internationale Kommission für wissenschaftliche Luftschiffahrt.
Strassburg i/E., den 21. Juni 1902.

SEHR GEEHRTER HERR KOLLEGE!

ICH beehre mich, darauf aufmerksam zu machen, dass die nächste internationale Ballonfahrt am Donnerstag, den 3. Juli 1902 stattfinden soll.

Ich wäre Ihnen zu grossem Danke verpflichtet, wenn Ihr Institut sich daran beteiligen würde.

Mit ausgezeichneter Hochachtung,

PROF. DR. H. HERGESELL.

Internationale Kommission für wissenschaftliche Luftschiffahrt.
Strassburg i/E., den 26. Juni 1902.

HOCHGEEHRTER HERR KOLLEGE!

IM Verfolg meines Schreibens vom 21. Juni, betreffend die internationale Ballonfahrt am 3. Juli 1902, beehre ich mich noch mitzuteilen, dass auf der Berliner Konferenz unserer Kommission beschlossen worden ist, einen Registrirballon, wenn irgend möglich *1 Stunde vor Sonnenaufgang* empor zu senden. Ich wäre Ihnen zu grossem Danke verpflichtet, wenn diese Massnahme auch an Ihrer Station erfolgen würde.

Ferner beehre ich mich mitzuteilen, dass ebenfalls im Verfolg eines Wunsches unserer Konferenz von Strassburg wiederum ein Röhrenthermometer, System Hergesell und ein Teisserenc de Bort'sches Thermometer neuerer Construktion, die auf derselben Trommel schreiben, emporgesandt werden sollen. Aehnliche Instrumente sind für die Petersburger und Pariser Auffahrten in Vorbereitung.

Hochachtungsvoll und ganz ergebenst,

H. HERGESELL.

M.O. 1220.

Balloon Factory, Aldershot,
July 1, 1902.

MY DEAR SIR,

NO doubt you are aware I attended the International Aeronautical Congress held in Berlin last month as the Military Representative of Great Britain.

Amongst the many subjects that came up for discussion, one of the chief was :—

International Meteorological Observations taken by self-recording instruments by means of Ballon Sonde (non-man carrying balloons) and kites. The main idea being that these instruments should be sent up on the same day in various countries, and the data so obtained, should be compared together and so some fresh knowledge of the upper currents, &c. be gained, and a new check made on the ground observations.

The Congress requested me to lay their wishes before the British and Indian Governments, especially the latter, on account of the Monsoons.

The German Government proposes sending a meteorological expedition to Samoa this winter to study this question.

Can you tell me who would be the best person in the Indian Office to approach on this subject, and will you kindly bring this matter before your Council?

I enclose copies of letters I have just received from Germany.

Believe me, your's truly,

T. C. TROLLOPE,
Major, late Grenadier Guards.

To the Secretary,
Meteorological Council,
63, Victoria Street, W.

The Secretary was instructed to reply that the Council are not in a position to participate in the investigation, and on receipt of a communication "auf diplomatischem Wege," to refer the question of observations in India to the Under Secretary of State for India.

390. *Antarctic Expedition* (Minutes 313, 379).—The Secretary was directed to forward a copy of Captain Hepworth's memorandum for the information of the Presidents of the Royal Society and Royal Geographical Society.

391. *Quarterly Current Charts of the Pacific.*—The Secretary was authorised to apply to the Hydrographic Office for a further supply of the charts for official use. (P.C. 2101).

392. *Publications : Presentation Copies.*—Read—Letter (M.O. 1,230) from the McGill University Library, Montreal, applying for future publications of the Office as they appear.

Application approved (P.C. 2105).

393. *Inspections.*—The Secretary was authorised to make arrangements for the inspections of observatories and stations by members of the Kew Staff or of the Office Staff in accordance with the arrangements approved last year (Minute 91). See P.C. 1753.

394. *Logs.*—Nine received, two excellent.

395. *Storm Warnings.*—Reported :—

Since the last meeting of the Council no warnings have been issued, nor any gales experienced on the Coasts of the British Islands.

FREDC. GASTER.

Forecasting Branch,
4th July, 1902.

396.

STORM WARNING CHECKING.

COMPARISON BETWEEN THE WARNINGS AND THE SUBSEQUENT WEATHER IN 1901.

Coasts.	Total No. of Warnings.	Warnings justified by subsequent gales. Force 8 and upwards.	Warnings justified by subsequent strong winds. Forces 6 and 7.	Warnings not justified by subsequent weather.	Warnings late. Force 9 reached at two stations before issue.	Warnings partially late. Force 9 reached at one station before issue.	Warnings issued in consequence of telegraphic errors.	Storms for which no Warning was Issued.
SCOTLAND, N.E.	41	31	5	5	—	—	—	Jan. 28–29, Jan. 30, Mar. 1, Dec. 12–13.
Do. E.	29	14	9	5	—	1	—	
Do. N.W. ...	44	28	9	3	—	4	—	Jan. 28–29.
Do. W.	41	13	22	6	—	—	—	
IRELAND, S.W.	42	26	11	3	1	1	—	
Do. N.W.	50	38	9	1	1	1	—	Jan. 30, Mar. 1, Oct. 8–9.
IRISH SEA	48	36	6	2	2	2	—	Jan. 28–29, Mar. 19–20, Oct. 8–9.
ST. GEORGE'S CHANNEL	34	18	13	2	1	—	—	
BRISTOL CHANNEL ...	34	23	9	—	—	2	—	
ENGLAND, S.W.	34	23	8	—	—	3	—	
Do. S.	27	16	9	2	—	—	—	
Do. S.E.	27	16	7	4	—	—	—	
Do. E.	22	13	6	2	—	1	—	
Do. N.E.	25	15	7	2	—	1	—	Jan. 28–29, Dec. 12–13.
TOTALS	498	310	130	37	5	16	—	
PERCENTAGES ...	—	62·3	26·1	7·4	1·0	3·2	—	

GALES EXPERIENCED FOR WHICH NO WARNINGS WERE ISSUED.
1901.

January 28th–29th.—A N.Wly. gale over all the Nn. parts of the Kingdom. No reports from Nn. stations were received for 2 p.m. and 6 p.m. on the 28th, a previous gale having destroyed electric communication with those regions.

January 30th.—A N. and N.Wly. gale in Scotland N.E., and in Ireland N.W., caused by a secondary disturbance, which on the night of the 29th came rapidly over the Nn. parts of the North Sea from the Nwd.

March 1st.—A S.Ely. gale in Scotland N.E., and Ireland N.W. The Wn. and Sn. coasts had been promptly warned on the night of February 28th, at which time the Nn. parts were not threatened. By 8 a.m. on March 1, however, the gale had extended to the Nn. coasts also.

March 19th–20th.—A N.Ely gale in the Irish Sea. The S. and E. coasts had been warned, but the gale extended further to the Nwd. on our Western coasts than was anticipated.

October 8th–9th.—A N.Wly. gale over Ireland N.W. and the Irish Sea. The gale appeared in the rear of a depression moving rapidly from N.W. At 6 p.m. 8th, the appearance was not very threatening, but by 8 a.m. 9th, the centre was over Holstein.

December 12th 13th.—An Ely. and N.Ely. gale on the N.E. coasts of Scotland and England. The S.E. and E. coasts of England had been warned on morning of 12th, when the more Nn. coasts did not seem threatened. Later on telegraphic communication with the N. was interrupted.

397. *Forecasts* for June, 1902 :—

The letters used have the following signification :—
a = complete success.
b = partial (*i.e.*, more than half) success.
c = partial failure.
d = total failure.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success. a + b.
Scotland, N.	a	47	80	64	84
"	b	27	14	20	
"	c	26	3	15	
"	d	0	3	1	
Scotland, E.	a	47	77	62	84
"	b	30	13	22	
"	c	23	7	15	
"	d	0	3	1	
England, N.E.	a	37	67	52	84
"	b	37	27	32	
"	c	16	6	11	
"	d	10	0	5	
England, E.	a	50	53	52	80
"	b	30	27	28	
"	c	13	20	17	
"	d	7	0	3	
Midland Counties	a	50	54	52	84
"	b	34	30	32	
"	c	13	13	13	
"	d	3	3	3	
England, S.	a	57	54	56	89
"	b	33	33	33	
"	c	10	13	11	
"	d	0	0	0	
Scotland, W.	a	50	80	65	92
"	b	33	20	27	
"	c	17	0	8	
"	d	0	0	0	
England, N.W.	a	50	60	55	95
"	b	50	30	40	
"	c	0	10	5	
"	d	0	0	0	
England, S.W.	a	70	70	70	94
"	b	20	27	24	
"	c	10	3	6	
"	d	0	0	0	
Ireland, N.	a	63	67	65	92
"	b	27	27	27	
"	c	7	6	7	
"	d	3	0	1	
Ireland, S.	a	57	73	65	94
"	b	33	24	29	
"	c	7	3	5	
"	d	3	0	1	
Summary.					
British Islands	a	53	67	60	89
"	b	32	25	29	
"	c	13	7	10	
"	d	2	1	1	

398. *Forecasts* issued at 8.30 p.m. daily during the month of June, 1901 :—

The letters used have the following signification :—

a = complete success. | **c** = partial failure.
b = partial (*i.e.*, more than half) success. | **d** = total failure.

Districts.		Percentages.			Percentage of Success. a + b.
		Wind.	Weather.	Average Forecast.	
Scotland, N.	a	47	53	50	79
"	b	30	27	29	
"	c	17	13	15	
"	d	6	7	6	
Scotland, E.	a	50	77	64	90
"	b	33	20	26	
"	c	17	3	10	
"	d	0	0	0	
England, N.E.	a	50	70	60	89
"	b	33	24	29	
"	c	10	3	6	
"	d	7	3	5	
England, E.	a	70	57	64	79
"	b	13	17	15	
"	c	10	20	15	
"	d	7	6	6	
Midland Counties	a	74	70	72	90
"	b	13	23	18	
"	c	0	7	4	
"	d	13	0	6	
England, S.	a	77	57	67	92
"	b	17	33	25	
"	c	3	10	7	
"	d	3	0	1	
Scotland, W.	a	50	84	67	87
"	b	27	13	20	
"	c	17	3	10	
"	d	6	0	3	
England, N.W.	a	53	73	63	85
"	b	27	17	22	
"	c	13	7	10	
"	d	7	3	5	
England, S.W.	a	71	67	69	87
"	b	13	23	18	
"	c	13	7	10	
"	d	3	3	3	
Ireland, N.	a	60	63	62	82
"	b	13	27	20	
"	c	17	10	13	
"	d	10	0	5	
Ireland, S.	a	63	63	63	85
"	b	20	23	22	
"	c	10	7	8	
"	d	7	7	7	
Summary.					
British Islands	a	60	67	64	86
"	b	22	22	22	
"	c	12	8	10	
"	d	6	3	4	

399.

REPORT ON THE COMPARISON OF THE FORECAST ISSUED AT 8h. 30m. p.m.. WITH THE WEATHER SUBSEQUENTLY EXPERIENCED, for the 12 months April, 1901, to March, 1902. The results are for the United Kingdom as a whole.

The letters used have the following signification :—

a = complete success.
b = partial (more than half) success.
c = partial failure.
d = total failure.

The checking has been conducted on the same system as that employed in previous years, *i.e.*, each forecast has been considered under the separate headings of "Wind" and "Weather," but the results of the 8.30 p.m. Forecasts only are here published.

The first column gives the percentage of success in "Wind" the second in "Weather," and the third the average of the two.

Months.		Percentages.				Months.		Percentages.			
		Wind.	Weather.	Average.	a + b.			Wind.	Weather.	Average.	a + b.
April	a	43	59	51	82	November ...	a	51	70	61	89
	b	34	28	31			b	32	25	28	
	c	19	8	14			c	12	5	9	
	d	4	5	4			d	5	0	2	
May	a	68	69	69	88	December ...	a	47	67	57	82
	b	19	20	19			b	28	22	25	
	c	10	10	10			c	18	7	13	
	d	3	1	2			d	7	4	5	
June	a	60	67	64	86	January ...	a	49	68	59	86
	b	22	22	22			b	29	26	27	
	c	12	8	10			c	16	5	11	
	d	6	3	4			d	6	1	3	
July	a	57	61	59	80	February ...	a	51	61	56	88
	b	19	23	21			b	32	31	32	
	c	16	9	13			c	12	6	9	
	d	8	7	7			d	5	2	3	
August ...	a	44	73	59	85	March ...	a	39	57	48	79
	b	34	19	26			b	35	27	31	
	c	18	5	12			c	21	15	18	
	d	4	3	3			d	5	1	3	
September ...	a	61	60	61	87	The Entire Year.	a	51	64	58	84
	b	25	28	26			b	28	25	26	
	c	8	5	7			c	15	8	12	
	d	6	7	6			d	6	3	4	
October ...	a	39	61	50	78						
	b	30	26	28							
	c	20	9	15							
	d	11	4	7							

400. *Boy Clerk.*—The Secretary reported that he had appointed H. S. B. Tarrant as Boy Clerk after a probation of one month, the appointment to date from May 21, 1902.

Approved.

401. *Reports of Work*—June, 1902 :—

MONTHLY RETURN OF "A." AND "M.O." INSTRUMENTS.

June, 1902.

—	Barometers.	Aneroids.	Thermometers. Ordinary.	Thermometers. Maximum.	Thermometers. Minimum.	Thermometers. Solar Radiation.	Thermometers. Terr. Radiation.	Screens.	Hydrometers.	Rain Gauges.	Anemometers.	Storm Cones.	Sunshine Recorders.	Glass Spheres.	Miscellaneous.
"A" ACCOUNT.															
Dr.															
On charge, 1st June, 1902	37	112	95	106	108	—	—	71	41	2	—	—	—	—	
Received since	20	20	47	9	11	—	—	—	—	—	—	—	—	—	
	57	132	142	115	119	—	—	71	41	2	—	—	—	—	
Cr.															
Sent out during month...	7	11	43	1	2	—	—	—	—	—	—	—	—	—	
On charge, 1st July, 1902	50	121	99	114	117	—	—	71	41	2	—	—	—	—	
"M.O." ACCOUNT.															
Dr.															
On charge, 1st June, 1902	18	3	152	13	1	3	5	14	81	9	1	9	2	7	1 Barograph, 1 Hygrograph.
Received since	1	—	15	1	—	—	—	—	4	—	—	—	3	—	
	19	3	167	14	1	3	5	14	85	9	1	9	5	7	
Cr.															
Sent out during month...	12	1	123	2	1	—	—	9	27	1	—	1	2	4	
On charge, 1st July, 1902	7	2	44	12	—	3	5	5	58	8	1	8	3	3	1 Barograph, 1 Hygrograph.

4th July, 1902. R. F. WALLACE.

MARINE BRANCH.

July 3rd, 1902.

Examined 14 new logs and 1 lighthouse register.

District south of the Equator, between the west coast of Africa and 90° W. longitude. Preparing Ocean charts for engraving and publication, also examining Admiralty Sailing Directions for notes of wind and weather on African coast. January and February Charts completed and sent for engraving.

Indian Ocean District—from latitude 30° N. to 30° S.—Preparing and extracting data in Office logs.

Monthly Pilot Chart of the North Atlantic and Mediterranean. July passed for press. August and September sent to the lithographer. Obtaining sea temperature results for April and May, and wind and fog results to north of 50° N. latitude for July and August. Registering and acknowledging reports of Ice and Sea Temperature, and issuing Charts and fresh supplies of Forms.

Sailing Directions for South America. Completing results of meteorological observations at several places for publication in new issue.

Examination in meteorology of the cadets on board the training ships "Conway" and "Worcester." Tabulating results, &c.

Sea Temperature Charts for Atlantic, Indian, and Pacific Oceans. Examining proofs of photo-lithographed charts for re-issue of publication No. 59.

Mr. Carter has given assistance throughout month in Weather Telegraphy.

CHAS. HARDING.

TELEGRAPHIC BRANCH.

Daily Weather Reports.—All numbers issued promptly ; monthly corrections and additions for *May* being copied out for Press. New copy for Map IV. prepared, &c.

Weekly Weather Reports.—All the portion contributed by this branch ; the maps, remarks, continental notes for 7 days, and the general notes were handed in and proof checked, promptly to date.

Storm Warning Checking—final—for 1901 completed. Summary in hand.

Storm Warning Checking—primary—for 1902 done to date.

Preparation of Report on Times of Arrival of Foreign Telegrams—daily—*May* done—*June* not commenced.

Checking of Observatory Records.—Barometer and Thermometer—for 5 Observatories—done for April.

Inquiries by Telegraph. Answered—29.

Hay Harvest Forecasts commenced on 1st June and maintained, promptly, on each day except Sundays.

Regular Routine Work.—Satisfactorily performed.

FREDC. GASTER.

OBSERVATORY BRANCH.

July 1st, 1902.

Hourly Means.—The remainder of the "copy" for the volume for 1899 was sent to the printer early in June, and proof has been passed for press up to p. 56. No proof has been received during the last three weeks. The calculation of the mean results for 1900 is in hand.

Tables of Mean Temperature.—The calculation of the tables for the extrapolation of mean values has been completed.

Tabulation of Anemograms.—The tabulation of the curves from the British stations has been completed to March 31, 1902.

Examination Work.—A beginning has been made towards bringing the arrears of this work up to date. The arrears go back to the spring of 1900.

Miscellaneous.—Copies of Ben Nevis observations have been made for Prof. Hergesell, and of Strathpeffer sun records for Dr. Fox.

Halliwell's self-registering rain gauge has been erected on the roof of the office, and attended to as required.

Some suspected irregularities in the Bournemouth sunshine record have been further enquired into.

Tables of severe gales have been prepared for the Annual Report.

Pressure-tube Anemometers for Falmouth and for the Scottish Antarctic Expedition were examined and tested at the makers factory.

The Holyhead anemograms for June have been tabulated and copies sent to Dublin.

The making of 40 measurements for barograms and thermograms from the 5 Observatories has been completed for the month of April, 1902.

During the month Mr. Call was absent one week, and I a part of two days, on jury summonses.

R. H. CURTIS.

STATISTICAL AND LIBRARY BRANCH.

1. Issue of Publications :—

Daily and weekly publications regularly issued.

Appendix III. to the Weekly Weather Report for 1901 received and issued.

Preface to the Weekly Weather Report for 1901 received and issued.

Pilot Charts for July, 1902, received, and 274 copies issued; also 367 copies of charts for previous months issued to Captains of ships and others.

Presentation copies of publications, 44 in all, issued to Captains and Officers of ships and others.

Wind Charts for the Coastal Regions of South America (O. 159) received, and 61 copies issued.

2. Statistical and Station Work :—

Tables for weekly numbers of the "Weekly Weather Report," prepared to date and carried through the press.

Tables, and Maps Nos. 1, 3 and 4 for the Monthly Summary of the Weekly Weather Report for May, 1902, prepared and passed for press.

Appendix III. of the Weekly Weather Report, 1901 (Means of Temperature, Rainfall and Sunshine), revised and finally passed for press.

Preface to the Weekly Weather Report for 1901, revised and finally passed for press.

Results of daily observations of Temperature and Rainfall, prepared and regularly supplied to the Registrars General for their Weekly Returns, for—

England and Wales	15 Stations.
Ireland	6 Stations.

Ten-day Means for certain Stations prepared and supplied to Dr. Neumayer, Hamburg, to date.

Returns from Stations of the Second Order for 1899 proceeded with; 40 pages passed for press.

Cyprus Observations. Preparation of Results for Cyprus Blue Book proceeded with.

List of Stations and Observers, prepared for Appendix II. of the Report for 1901-2.

Some time occupied on work relating to the Meteorological Report for the Registrar General's Quarterly return (England and Wales).

Assistance given in Forecast Branch in connection with the King's Birthday and the public holidays.

Library :—

Accessions to Library received and catalogued on cards, as reported in Minutes.

Sixty-nine volumes of publications prepared and listed for binding.

Preparing list of printed Meteorological Returns from British Colonies and Protectorates now being received in the Library.

List of accessions to Library for Annual Report, 1901–2 (Appendix XI.) prepared and sent to printer.

Inquiries :—

Forty-seven inquiries were dealt with during June. Four of these were by letter, but in 39 cases personal application was made. In nine of the cases of personal application payment was made for the time occupied in the preparation of the information required.

Miss Cave, on behalf of Prof. Karl Pearson, F.R.S., and Mr. Hodgson, on behalf of Sir Norman Lockyer, F.R.S., engaged during the last two weeks in June in extracting data, mainly relating to pressure, for various Foreign and Colonial Stations.

JOHN A. CURTIS.

402. Submitted—the following statement of accounts :—

	£	s.	d.
Cash balance on 19th June	2,875	8	11
Receipts from 20th June to 3rd July	82	16	10
	2,958	5	9
Cheques drawn from 20th June to 3rd July ...	1,302	14	9
Cash balance on 3rd July	£1,655	11	0

403. *Library.*—Publications received since the last meeting :—

Aachen, Meteorologisches Observatorium.—Das meteorologische Observatorium Aachen auf der Industrie- und Gewerbe-Ausstellung Düsseldorf 1902.

Collenette, A.—The rainfall of Guernsey for 1901.

———— ————The sunshine of Guernsey for 1901.

Eastbourne.—Annual report of meteorological observations for the year 1901.

Guatemala, Laboratorio Quimico Central.—Observaciones meteorológicas correspondientes al año 1901.

Hopkinson, John.—Monthly and annual rainfall in the British Empire, 1877–96.

Lansing, Michigan State Board of Health.—Principal meteorological conditions in Michigan in 1900.

Lowestoft, Borough Meteorologist.—Meteorology of Lowestoft in 1901, by C. W. Edwards, Borough Meteorologist.

Lyons, C. J.—Weather record for Honolulu and the Hawaiian Islands, 1898.

Nicosia, Public Works Department.—Statement of rainfall recorded at six stations in Cyprus from April to September, inclusive, during the years 1882 to 1901.

Pola, Hydrographisches Amt der K. K. Kriegs-Marine.—Veröffentlichungen. Gruppe iii. Relative Schwerebestimmungen durch Pendelbeobachtungen. 3. Heft.

———————————————————————Veröffentlichungen. Gruppe iv. Erdmagnetische Reise-Beobachtungen. 3. Heft.

Polis, P.—Wetterkunde und Landwirthschaft. Ueber die Wettervorhersage im Dienste der Landwirthschaft und die Förderung ihrer Kenntniss durch die landwirthschaftlichen Winterschulen.

Prague, K. K. Sternwarte.—Magnetische und meteorologische Beobachtungen . . . . 1901. 62. Jahrg.

Rijckevorsel, Dr. van.—Comparison of the instruments for absolute magnetic measurements at different observatories.

**Rudolph, E.*—Verhandlungen der vom 11. bis 13. April, 1901, zu Strassburg abgehaltenen ersten internationalen seismologischen Konferenz redigiert vom . . . . E. Rudolph. Ergänzungsband I. zu Beiträge zur Geophysik herausgegeben von G. Gerland.

Truro, Cornwall County Council, Sanitary Committee.—Annual report, vital statistics, and meteorological summary for 1902.

Wragge, C. L.—Report on the Mount Kosciusko Observatory and allied stations, 1898.

* Purchased.

63, *Victoria Street, S.W., 8th October*, 1902.

PRESENT :

SIR R. STRACHEY, IN THE CHAIR.

MR. BUCHAN.	THE HYDROGRAPHER.
PROFESSOR DARWIN.	MR. SHAW (*Secretary*).

404. The Minutes of the last meeting (4th July) were read and confirmed.

405. *Annual Report.*—The Annual Report for the year ended 31st March was submitted and approved.

406. *Ben Nevis Observatories.*—The Chairman having been informed (M.O. 1,476) of the intention of the Government to cause a general inquiry to be made into the working of the Meteorological Council by a special committee to be nominated for the purpose, and it having been intimated that pending the result of this inquiry the Government considered it desirable that no change should be made in the arrangements under which the Ben Nevis and Fort William Observatories have till now been carried on, the Directors of these observatories were informed that the grants hitherto made would be continued as usual pending the results of the inquiry by the proposed committee.

Resolved—that this action be approved and confirmed.

407. *London Fog Inquiry* (Minute 388).—The Secretary submitted a draft of a letter to the London County Council, and it was ordered that the draft be printed and circulated. It was resolved that Captain Carpenter's report be put in type with the view of its forming part of a complete report to be drawn up at the close of the present winter.

The Secretary reported that as Captain Carpenter was unable to continue the investigation on account of his health, he had arranged for Mr. Lempfert to take charge of the inquiry provisionally, and with Captain Carpenter's co-operation arrangements for the recommencement of observations from 1st September had been set on foot, and Mr. W. D. Matthews re-engaged as clerk at a salary of £2 per week from August 25th.

Approved.

408. *Observations at Stations in Colonies and Dependencies* (Minutes 374, 386).—

(1) The Secretary reported that in view of the proposed inquiry by the Treasury he had not yet drafted the letter to the Colonial Office referred to in Minute 386.

Approved.

(2) The Secretary reported correspondence with the Colonial Office respecting a request from Professor Karl Pearson, F.R.S. (M.O. 1,452, 1,729 ; P.C. 2,214), for barometric readings at a number of stations on the Atlantic seaboard in British Colonies.

Approved.

(3) Read—letter (M.O. 1,669) from the Foreign Office enclosing a despatch from Colonel Sadler, Commissioner and Consul General in Uganda, referring to "the manner in which local meteorological records are being kept, especially to the recording of the level of the Victoria Nyanza," and asking for "instructions as to the best way for recording the level of the lake in accordance with scientific principles so that absolute accuracy may be obtained."

The Hydrographer undertook to deal with the question of lake levels, and it was resolved to edit for incorporation with the instructions the pamphlet of "Hints to Meteorological Observers in Tropical Africa, with instructions for taking observations," prepared by a committee of the British Association.

409. *International Co-operation for Balloon Ascents.*—Read—the following letter (M.O. 1,493) :—

M.O. 1,493.

Balloon Factory, Aldershot,
11th August, 1902.

SIR,

I HAVE the honour to enclose two papers which have passed between this Office and the War Office concerning the resolution passed at the Scientific Aeronautical Congress lately held at Berlin, and I beg that you will be kind enough to give your opinion on this subject.

I have, &c.,
F. C. TROLLOPE, Major,
Instructor in Ballooning.

To the Secretary,
Meteorological Society.

M.O. 1,493.

Aldershot,
15th July, 1902.

METEOROLOGICAL REPORTS FROM FOREIGN POWERS.

SIR,

IN pursuance of my Report on the Aeronautical Congress, held in Berlin during May, 1902, I have the honour to enclose for the information of the Inspector-General of Fortifications the original rules, &c., and the results of the meteorological observations made by the various Foreign Powers at the beginning of this month, and all collaborated together by Professor Hergesell, of Strassburg, late President of the Berlin Congress.

I venture again to bring to your notice the wish of the Congress that the Governments of Great Britain and India would combine with the other Powers so that some information may be obtained, especially concerning monsoons. The German Government is proposing to send a meteorological expedition to Samoa for this purpose.

I have, &c.,
F. C. TROLLOPE, Major,
Instructor in Ballooning.

To the Superintendent,
Balloon Factory, Aldershot.

also the following list of resolutions communicated to the Secretary of State for Foreign Affairs by the German Chargé d'Affaires and forwarded by the Foreign Office to the Royal Society "for any observations which the President may have to offer."

M.O. 1,493.

War Office, London, S.W.,
7th August, 1902.

Memorandum to the Superintendent, Balloon Factory, Aldershot, with reference to his letter of the 16th ult., 8406/8221, relative to the resolution of the Berlin Aeronautical Congress respecting meteorological observations by the various powers.

The Superintendent is requested to consider and submit a scheme showing what is considered necessary to meet the wishes of the Congress, as expressed in the resolution.

2. The scheme should include the proposals regarding India, judged to be desirable in the opinion of the Congress, in connexion with investigation of the monsoon phenomena.

3. It is not probable that any allotment of War Department funds would be available for the purposes of the observations.

4. It is suggested that the Meteorological Society might be communicated with before the details of the scheme are settled, as any provision of funds for the conduct of observations in this country would appear to be primarily for the consideration of the Home Office, and the initiative in the matter would apparently rest with the Meteorological Society.

5. The question of War Department co-operation cannot be taken up till the details of the proposals have been formulated.

H. BRETON,
Assistant Inspector-General of Fortifications.

INTERNATIONAL COMMITTEE FOR SCIENTIFIC AERONAUTICS.

Resolution No. 1.

(Translation.)

Proposer—THE PRESIDENT.

The committee express the wish that diplomatic negotiations be undertaken with a view to enabling them to carry with them on their ascents all necessary scientific instruments without hindrance. Should photographic plates give rise to difficulties when landing on foreign territory, such plates are to be handed over to a competent authority, to be appointed by international commission, for development and consideration.

Resolution No. 2.

(Translation.)

Proposer—THE PRESIDENT.

The international committee for scientific aeronautics request the Imperial Chancellor to take diplomatic steps for placing balloons carrying self-registering instruments sent up for scientific purposes under State protection.

Resolution No. 3.

(Translation)

Proposer—THE PRESIDENT.

The international committee for scientific aeronautics consider it an urgent necessity that an official organ for publishing the observations made during the simultaneous ascents, with as little delay as possible, be brought out.

As the presidency of the international committee for scientific aeronautics has been in German hands since its foundation in 1896, it seems advisable that the expenses of such publication be defrayed from German sources until the next meeting, which will take place in two years. The committee beg the Imperial Chancellor to prepare the necessary steps by this date in order that the international committee for scientific aeronautics may receive State organisation similar to that of the geodetic commission, and that individual States may be approached with a view to contributions.

Resolution No. 4.

(Translation.)

Proposers—ROTCH (America), BERSON (Berlin).

The international committee for scientific aeronautics consider the exploration of the atmosphere over the ocean and in tropical regions to be one of the most important tasks of the future. As a first step in this direction they recommend that steps be taken to send an exploring ship to the regions of the oceanic trade winds by which the physical conditions of the upper strata of the atmosphere may be examined by means of kites.

Résolution No. 5.

La Commission Internationale exprime le désir qu'on remette par voie diplomatique au gouvernement Russe ses remercîments expresses pour l'installation d'une section pour l'étude des couches supérieures de l'atmosphère, auprès de l'Observatoire Constantin, pour la part qu'a prise jusqu'ici le Parc d'Aérostation de St. Pétersbourg dans ses travaux et pour l'établissement d'une station de cerfs-volants auprès du Parc aéronautique da Karono.

En même temps la Commission croit que la coopération de la Russie dans l'avenir, et sourtout durant l'expédition qui doit être entreprise en 1903 pour étudier l'atmosphère au dessus de l'Atlantique au moyen de cerfs-volants, serait de la plus grande importance pour le succès de la grande entreprise, vu l'immense étendu de l'Empire de la Baltique jusqu'a l'Océan Pacifique. Cette opération devrait s'effectuer par un développement de travaux déjà exécutés aussi que par l'installation des stations de cerfs-volants auprès de tous les parcs aéronautiques et une organisation d'observations météorologiques avec des cerfs-volants dans la marine, qui serait de la plus grande utilité Probablement une grande partie de ces nouveaux établissements pourrait se faire avec le moins de difficulté auprès des installations de cerfs-volants pour lever les hommes.

Résolution No. 7.

La Commission Internationale remercie beaucoup le gouvernement espagnol qu'il a délégué M. le Commandant Don Pedro Vives y Vich à ses séances pour la délibération des questions scientifiques.

Elle a entendu avec beaucoup de plaisir et d'intérêt la communication de Don Pedro Vives y Vich, qu'il essayera tout pour aider les recherches scientifiques qui seront exécutées de la part de ses membres. Elle est d'opinion, qu'il serait très désirable, que l'Espagne participât aux expériences internationales simultanées.

Resolution No. 8.

The International Committee for Scientific Aeronautics thinks that the co-operation of the British and Indian Governments in the exploration of the upper atmosphere by the means of balloons and kites, more particularly within the tropics, forms a most important part of their work.

Résolution No. 9.

La Commission Internationale d'Aérostation scientifique remercie chaudement le gouvernement Italien d'avoir envoyé comme réprésentants du dit Gouvernement auprès de la conférence de Berlin M. M. le Professeur Palazzo, directeur du Bureau météorologique central, le Commandant Borgatti et le capitaine Moris. Elle exprime ses remerciements spéciaux pour la communication faite par le Prof. Palazzo, selon laquelle, à commencer de l'automne des cerfs-volants et des ballons, munis d'appareils enregistreurs météorologiques, seront régulièrement lancés d'une station établie à Rome près du Fort du Monte Mario, aux jours d'ascensions scientifiques simultanées fixés par la Commission Internationale. De cette manière pour la première fois des recherches physiques seront faites dans les couches élevées de l'atmosphère dans les régions au delà des Alpes.

The Secretary was authorised to inform the Secretary of the Royal Society that the Council had no means for taking part in the international investigation of the upper air by balloons or kites ; that they were willing to render any assistance in the consideration of the question whether such an investigation is practicable in the British Isles, and, if so, what steps would be necessary for carrying it out.

410. *Telegraphic Reporting Stations.—Aberdeen* (Minute 387).—Mr. Buchan reported that Professor Niven was of opinion that it was desirable that both sections

of the meteorological work at Aberdeen should be in the same hands. He also (M.O. 1,815 (2)) reported that there was a telephone at King's College in communication with the General Post Office at Aberdeen.

Resolved—that the Council concur in Professor Niven's opinion, but they adhere to the resolution of Minute 387 to change the observer for telegraphic reports at Aberdeen.

411. *Telegraphic Reporting Stations.—Loughborough.*—The question of the payment of the observer for 2 p.m. reports for the Harvest Forecasts was referred to the Chairman.

412. *Telegraphic Report from the Azores.*—Read—M.O. 1,515 :—

M.O. 1,515.

General Post Office, London,
16th August, 1902.

SIR,

WITH reference to your call at this Office of the 15th May last respecting the transmission over the Azores-Waterville Cable, of the Commercial Cable Company, of meteorological telegrams from the Azores, I am directed by the Postmaster-General to acquaint you that he has been in communication with the Commercial Cable Company on the subject.

The Company state that they would be willing to arrange for the free transmission from Horta, Fayal, to this country, over the Azores-Waterville Cable, of one daily meteorological telegram containing not more than ten words, on condition that such free transmission shall not be considered as establishing a precedent, and that the privilege may be withdrawn whenever the Company shall deem necessary

The Postmaster-General will be glad to learn if the Meteorological Office desires to avail itself of the arrangement offered, in order that the Company may be duly informed.

I am, &c.,
A. F. KING,
For the Secretary.

W. N. Shaw, Esq.,
Meteorological Office.

and M.O. 1,626, received from M. Mascart in reply to a letter informing him of the action of the Post Office :—

M.O. 1,626.

Bureau Central, Météorologique,
Paris, le 1er Septembre, 1902.

MON CHER COLLÈGUE,

J'ÉTAIS absent de Paris quand votre lettre du 20 Août m'est parvenue et j'ai attendu, avant de vous répondre, d'avoir des renseignements au sujet de la "Commercial Cable Company" relativement à la transmission gratuite de la dépêche des Açores. Notre Ministère des Affaires Etrangères a reçu une communication identique à celle que vous avez bien voulu me transmettre.

L'Administration des Télégraphes continue les pourparlers avec la Compagnie. Dès que l'entente sera définitivement établie, nous en informerons Mr. Chaves; j'espère donc que nous pourrons prochainement recevoir ces dépêches par Waterville, ce qui sera un grand progrès.

Veuillez agréer, mon cher Collègue, l'assurance de mes sentiments bien dévoués,

E. MASCART.

à Monsieur William N. Shaw,
Secretary of the Meteorological Office.

The Secretary was directed to make further inquiries in the matter.

413. *Valencia Observatory.*—Read—M.O. 1,434 from Mr. Cullum respecting the letting of grazing land.

The Secretary was directed to communicate with the lessors and report further upon the matter.

414. *Falmouth Observatory.—Anemometer at Pendennis Castle* (Minutes 286, 346) —Submitted the following report :—

M.O. 1,428.

28th July, 1902.

SIR,

I BEG to report that I left London for Falmouth on the 14th inst., and found the packages containing the anemometer stored at the Falmouth Coast Guard Station.

On the 15th, with Mr. Burch, the chief officer of the Coast Guard, I selected a site for the instrument on the roof of Pendennis Castle, and then called on Col. Walker, commanding the troops at Falmouth, and obtained from him passes for myself and Mr. Kitto to admit to the castle. Mr. Kitto then introduced me to Mr. W. Cox (of Cox & Co., engineers and shipbuilders), with whom I arranged for the supply of material and workmen for erecting the mast and getting up the anemometer. The hoisting of the mast and fitting and splicing of the wire stays was done by Coast Guards.

The roof of the castle is circular and about 20 ft. in diameter. In the centre is a hut about 7 ft. square used by the Coast Guard for their look-out. Access to the roof is obtained by a winding stair in a small turret on the west side of the tower. A wall 7 ft. high surrounds the roof, and the stair turret was 4 or 5 ft. higher. Adjoining the turret is a mast quite 50 ft. high used for signalling purposes, and it also carries halyards and guides for hoisting and dropping a time ball. I erected the iron mast at the S.E. corner of the hut and stayed it by four wire stays with screw adjusting hooks fixed to hold-fasts which I found in the wall. As the roof of the castle is curved I had to get an

iron foot made to give me a level base on which to place the mast, and a flange which was screwed to the bottom of the mast was then bolted through the foot and the floor and secured below with wide iron nuts. The mast was also fastened to the hut by an iron bracket passing round it and firmly screwed to the upper edge of the hut.

The erection of the instrument was completed and the record commenced on the 18th, and the instrument was found to be working satisfactorily when I visited it again with Mr. Wilson Fox and Mr. Kitto at 9 a.m. on that day.

The exposure is, I consider, very satisfactory. The roof of the castle is above the level of the highest part of the town of Falmouth, and also of most of the hills in the immediate neighbourhood. The vane is about 32 ft. above the roof of the castle, which was as high as I judged it safe to attempt with the limited area available for splaying the stays, and is about 250 ft. above h'gh water. From about S.W. to S.E. the exposure is open to the sea; from S.E. to N.E. land intervenes between the harbour and the channel, but its height is nowhere greater than that of the castle; from N.E. through N. to S.W. there is hilly land all round, but the hills are not higher than the castle, except due West where they are about 600 ft. high at a distance of probably five or six miles, and to the North-West where they rise to 800 or 900 ft., but are mostly 10 or 12 miles distant.

I made enquiry as to the possibility of exhibiting the anemograms daily. If a frame is supplied Mr. Burch will exhibit the records outside the coast guard station, changing the sheet each morning. The objection to this site is that it is far removed from the business part of the town, and especially from any places frequented by seafaring men. The proper place for the exhibition of the record is in front of the Custom House, and I ascertained that the sheets can be shown there if arrangements can be made for them to be taken there each morning.

I returned to Falmouth from Scilly on the evening of the 24th and saw the sheet changed by Mr. Burch on the morning of the 25th; the instrument was then giving a very satisfactory record.

I returned to London on the 28th.

R. H. CURTIS.

The payment of £10 per annum to the chief officer of the coastguard for the care of the anemometer was authorised.

415. *Fleetwood Anemometer* (Minute 12, 26th March 1901).—Reported—that the anemometer had been re-erected upon the new pavilion and that the Local Authority had suggested (M.O. 1771) the payment of £10 per annum as a nominal rent.

The Secretary was authorised to continue the payment, which lapsed when the anemometer was taken down, upon the same terms as were then in force, viz., £10 per annum for the care of the anemometer.

416. *Marine Observations.—Agency at Dundee.*—Report on the supply of instruments to the Mercantile Marine at Dundee.

When in Dundee on August 4th I called at 33, Dock Street, where the agency for Dundee has been for sometime located. I satisfied myself that the instruments on hand accorded with the vouchers. Having learned that Captain John McGlashan wished to give up the agency, and that Mr. C. H. Brown, assistant teacher at the Government Navigation School, Dundee, desired to be appointed for the agency, I made the appointment. I had a somewhat lengthened interview with Mr. Brown, and I am led to think the appointment will turn out to be a good one for the office.

Mr. Brown is particularly desirous that before the fleet sails in spring some one should be instructed by the Council to go to Dundee and personally confer with the captains, with the view of removing existing misconceptions and explaining to them the great value the Meteorological Council sets on their work.

ALEXANDER BUCHAN.

417. *Instruments.*—Quarterly Return.

RETURN of ADMIRALTY INSTRUMENTS in the OFFICE and at HIS MAJESTY'S DOCKYARDS for the QUARTER ending 30th June, 1902.

Place and Date.	Particulars.	Barometers.		Thermometers.			
		Mercurial.	Aneroid.	Ordinary.	Max.	Min.	Screens.
Meteorological Office.	Available 1st April, 1902	63	145	61	60	44	53
	Received, new	14	—	—	16	30	30
	„ repaired and cleaned.	6	39	17	—	—	—
	Total	83	184	78	76	74	83
	Issued	14	55	51	9	11	12
	Total available 1st Jul., 1902	69	129	27	67	65	71

RETURN of ADMIRALTY INSTRUMENTS for the QUARTER ending 30th June, 1902.

Depôts.	BAROMETERS.								THERMOMETERS.															
	Mercurial.				Aneroid.				Ordinary.				Maximum.				Minimum.				Screens.			
	Est.	Store.	Surplus.	Shortage.	Est.	Store.	Surplus.	Shortage.	Est.	Store.	Surplus.	Shortage.	Est.	Store.	Surplus.	Shortage.	Est.	Store.	Surplus.	Shortage.	Est.	Store.	Surplus.	Shortage.
*Portsmouth	25	17	—	8	55	39	—	16	150	119	—	31	50	45	—	5	50	46	—	4	25	12	—	13
Devonport	25	26	1	—	55	56	1	—	150	150	—	—	50	56	6	—	50	53	3	—	22	21	—	1
Chatham	25	20	—	5	55	42	—	13	150	126	—	24	50	44	—	6	50	44	—	6	25	22	—	3
Sheerness	6	2	—	4	15	11	—	4	30	23	—	7	10	8	—	2	10	10	—	—	10	8	—	2
Queenstown	2	2	—	—	2	4	2	—	3	12	9	—	3	8	5	—	3	8	5	—	—	3	3	—
(Dockyards, Home) Total	83	67	1	17	182	152	3	33	483	430	9	62	163	161	11	13	163	161	8	10	82	66	3	19
*Gibraltar	2	2	—	—	2	1	—	1	4	8	4	—	3	3	—	—	3	3	—	—	—	—	—	—
*Malta	11	8	—	3	15	12	—	3	60	57	—	3	10	10	—	—	10	8	—	2	1	1	—	—
Bombay	4	4	—	—	3	3	—	—	10	12	2	—	4	4	—	—	4	4	—	—	1	2	1	—
Halifax	3	3	—	—	4	4	—	—	20	18	—	2	4	4	—	—	4	2	—	2	1	2	1	—
Bermuda	3	4	1	—	4	5	1	—	20	17	—	3	4	4	—	—	4	5	1	—	1	2	1	—
Jamaica	3	2	—	1	2	4	2	—	10	10	—	—	2	—	—	2	2	1	—	1	1	1	—	—
*Cape of Good Hope	7	3	—	4	8	6	—	2	33	25	—	8	8	9	1	—	8	5	—	3	2	2	—	—
Trincomalee	3	2	—	1	3	2	—	1	10	14	4	—	4	5	1	—	4	4	—	—	1	1	—	—
Hong Kong	17	14	—	3	21	17	—	4	87	78	—	9	21	12	—	9	21	22	1	—	5	12	7	—
Coquimbo (31st March) ...	2	1	—	1	4	3	—	1	15	11	—	4	2	3	1	—	2	4	2	—	1	1	—	—
Sydney	5	1	—	4	6	8	2	—	25	11	—	14	6	2	—	4	6	1	—	5	1	1	—	—
Esquimalt	4	2	—	2	5	8	3	—	15	19	4	—	2	2	—	—	2	2	—	—	1	2	1	—
(Dockyards, Abroad) Total	64	46	1	19	77	73	8	12	309	280	14	43	70	58	3	15	70	61	4	13	16	27	11	—
Grand Total and Net Shortage at Depôts	147	113	—	**34**	259	225	—	**34**	792	710	—	**82**	233	219	—	**14**	233	222	—	**11**	98	93	—	**5**
Meteorological Office... ...	45	**69**	24	—	120	**129**	9	—	250	**27**	—	223	80	**67**	—	13	80	**65**	—	15	50	**71**	21	—
Repairing	—	—	23	—	—	—	11	—	—	—	9	—	—	—	—	—	—	—	—	—	—	—	—	—
Returnable from Depôts ...	—	—	10	—	—	—	11	—	—	—	—	—	—	—	2	—	—	—	2	—	—	—	—	—
Ordered	—	—	—	—	—	—	—	—	—	—	252	—	—	—	20	—	—	—	20	—	—	—	10	—
Net Surplus or Shortage at M.O.	—	—	57	—	—	—	31	—	—	—	38	—	—	—	9	—	—	—	7	—	—	—	31	—
Proposed to be Ordered ...	—	—	—	—	—	—	—	—	—	—	108	—	—	—	20	—	—	—	20	—	—	—	—	—

Approved.

* Supplies forwarded to these Depôts since 30th June, 1902.

R. F. WALLACE. 20th September, 1902.

418. *Publications.—Presentation Copies.*—The Secretary was authorised to present a copy of the "Temperature Tables" to Mr. J. Baxendell, of Southport.

419. *Publications.—Wind Tables.*—The Secretary reported that in compliance with a request from the War Office for information as to the force of the wind on the East Coast, he had given directions for a table of average wind forces for twelve years at Yarmouth to be prepared in accordance with the following scheme drawn up with a view to the preparation of a series of wind tables for the British Isles for publication. (*See* Minute 122) :—

WIND TABLES.—ANEMOGRAPH STATIONS.

Valencia, 1871-1900.

MILES per hour. Nominal. Robinson factor 3.	MILES per hour. [Dines' Scale.] Robinson factor 2·2.	EQUIVALENT estimated FORCE. Beaufort Scale.	Number of observations of different wind forces from each of eight directions per 1000 hourly readings for each month of the year. The numbers per 1000 are arranged in the separate squares for each group of forces according to the eight directions on the following scheme.	NW N NE / W TOTAL per 1000. E / SW S SE

			OCTOBER.	NOVEMBER.	DECEMBER.	JANUARY.	FEBRUARY.	MARCH.
0—4	0—3	0 Calm.	54	35	23	56	54	43
5—20	4—15 inclusive.	1—4 Light airs to moderate breezes.	67 48 51 72 465 62 71 52 42	161 7 28 341 761 29 69 66 60	64 7 0 226 609 3 212 88 9	43 6 7 149 636 71 152 106 102	231 80 30 253 808 49 67 70 28	94 17 43 112 599 82 86 60 105
21—40	Above 15 and below 30.	5—6 Fresh to strong wind.	35 13 7 85 305 28 72 29 36	2 3 3 76 173 19 34 12 24	2 9 26 92 258 21 39 44 25	11 1 0 99 264 9 63 66 15	0 10 7 2 136 28 0 85 4	4 12 7 8 260 38 23 40 128
41—55	30—40 inclusive.	7—8 Gales.	4 8 6 20 130 21 28 20 23	0 0 0 2 20 0 12 3 3	4 1 3 7 60 2 10 18 15	0 0 0 20 40 9 11 0 0	0 0 0 0 2 0 2 0 0	0 0 0 8 83 0 71 2 2
56—81	Above 40 and less than 60.	9—10 Heavy gales.	4 1 2 7 38 1 12 6 5	0 0 0 3 11 1 2 4 1	0 0 0 11 48 10 10 12 5	0 0 0 0 4 0 0 4 0	0 0 0 0 0 0 0 0 0	0 0 0 0 15 0 0 2 13
82—95	60—70 inclusive.	11 Very heavy gales.	2 0 0 3 7 1 0 0 1	0 0 0 0 0 0 0 0 0	0 0 0 0 2 0 0 2 0	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0
96—	70—	12 Hurricane.	0 0 0 0 1 0 1 0 0	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0
Mean Velocity (factor 2·2), irrespective of direction, in miles per hour.			15	10	12	9	8	12

			APRIL.	MAY.	JUNE.	JULY.	AUGUST.	SEPTEMBER.
0—4	0—3	0 Calm.	26	58	49	173	77	67
5—20	4—15 inclusive.	1—4 Light airs to moderate breezes.	78 46 37 96 765 46 162 125 175	117 17 5 73 743 25 140 262 104	83 103 62 165 773 36 110 146 68	28 63 30 101 735 48 178 130 157	103 58 79 186 766 17 141 93 89	103 26 68 121 697 61 129 78 111
21—40	Above 15 and below 30.	5—6 Fresh to strong wind.	2 2 32 47 207 35 48 22 19	0 0 0 17 197 4 136 36 4	22 17 19 44 176 14 48 2 10	16 0 0 13 89 0 26 30 4	11 1 21 37 157 11 3 45 28	18 1 7 37 206 0 84 31 28
41—55	30—40 inclusive.	7—8 Gales.	0 0 0 0 2 0 2 0 0	0 0 0 0 2 0 0 2 0	0 0 0 0 2 0 2 0 0	0 0 0 3 3 0 0 0 0	0 0 0 0 0 0 0 0 0	0 0 0 0 30 0 28 2 0
56—81	Above 40 and less than 60.	9—10 Heavy gales.	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0
82—95	60—70 inclusive.	11 Very heavy gales.	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0
96—	70—	12 Hurricane.	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0
Mean Velocity (factor 2·2), irrespective of direction, in miles per hour.			8	8	7	6	7	8

Approved.

420. *Publications.—Temperature Tables Supplement.*—The final proof of the supplementary tables of five yearly means for the extrapolation of mean values (Minute 323) was submitted and approved.

421. *Cape Pembroke, Falkland Isles.*—Read—the following letter (M.O. 1,259) and enclosure :—

M.O. 1,259.

Board of Trade
(Fisheries and Harbour Department),
7th July, 1902.

SIR,

I AM directed by the Board of Trade to transmit to you herewith, to be laid before the Meteorological Council, extract from a letter which has been received from the principal keeper at Cape Pembroke Lighthouse, Falkland Islands, making an application for the supply of a thermometer and screens for use at that station ; and I am to inquire whether the Meteorological Council will be good enough to furnish the instruments in question.

I am, &c.,
T. H. W. PELHAM.

The Secretary,
Meteorological Office.

(Extract) H. 8,625.

I beg leave to report to you that on my arrival at this station I found the wet bulb thermometer broken (No. 1,207, B. T. Negretti & Zambra) ; also the wall screen containing the same. The other wall screen containing the maximum and minimum thermometers is in a very bad condition, and a new one is also required. In my humble opinion Stevenson's free standing screen, Fig. 10, would be much better. Stevenson's wall screens, Fig. 11, are in use at present.

The Secretary reported that the Scottish Antarctic Expedition would call at the Falkland Isles, and that Mr. Bruce was willing (M.O. 1,851) to carry the instruments with the expedition, and desired to leave a barograph and thermograph in charge of the lightkeeper during the time of the expedition.

He was authorised to send out a set of thermometers and a screen in Mr. Bruce's charge, and to ask Mr. Bruce to supervise the fixing of the Stevenson screen in a suitable position and the mounting of the instruments therein.

422. *Fishery Barometer, Crossbost.*—The Secretary reported that at the request of the Fishery Board for Scotland he had recalled the fishery barometer at Findon, Aberdeenshire, as it was reported to be no longer required, and had sent out another in place of it to Crossbost, Island of Lewis. (M.O. 1,258, 1,394.)

Approved.

423. *Inspections.*—Submitted the following reports for 1902 :—

REPORT OF INSPECTIONS OF STATIONS IN CONNEXION WITH THE OFFICE, 1902.

The Telegraphic Reporting Stations, a number of Climatological Stations, and the self-recording instruments at the Observatories and other stations have been inspected during the summer.

Dr. Buchan undertook the Scottish stations, Captain Hepworth those in the South and West of Ireland and South Wales, Mr. Gaster those in the South-east of England, Mr. R. H. Curtis those in the North-west of England, Mr. J. A. Curtis those in the North-eastern District, and Mr. Brodie the South-western District, while I visited certain stations in the North of Ireland and in parts of the North-west and East of England, and in the Midlands.

W. N. SHAW.

NOTES BY THE INSPECTORS.

TELEGRAPHIC REPORTING STATIONS.

ENGLAND AND WALES.

Clacton-on-Sea, July 21st.—The barometer is a wooden instrument, unverified, and suspended at door of Town Hall. The thermometers and rain guage are very well exposed in a vacant space near, and in, the martello tower. Observer is most careful as to accuracy.

F. G.

Dungeness, July 18th.—Tested all the instruments, and gave all necessary instruction to J. G. Williams, the new lightkeeper, who had already been instructed by his assistant (Mr. Smith) in the work generally. The barometer certainly reads a little too low, and the spare thermometer (which I brought away) was broken. The barometers were in the same place as hitherto, but the space was more confined. A new lighthouse is in course of construction, and modifications in altitude of barometer are probable—say in about nine months.

F. G

Holyhead, September 18th.—The instruments here were in very good order, and the screen and rain gauge had just been repainted. The latter instrument is in its old site, but during last winter some nine or ten trees which grew close to it were blown down, and in consequence the site has been much improved for rainfall observations. Mr. Chope read his barometer very accurately.

For reports on anemometers, *see* page 75.

R. H. C.

Jersey (*St. Aubin's*), August 22nd.—All the instruments were in excellent order, but the dry bulb and spare thermometers still showed a large error—amounting in the former case to + 1·0°, and in the latter to + 1·2°. I advised last year that a new dry bulb thermometer should, at least. be sent, and would again urge the desirability of this action. The observer, Mr. J. Fisher, appears to be very careful, and continues to take great interest in the work.

For report on sunshine recorder, *see* page 78.

F. J. B.

London (*Brixton*), August 13th.—The instruments were in good order, and the station properly managed.

W. N. S.

North Shields, September 3rd.—The outdoor instruments at this station are very old, and need renewal. The corrections to the thermometers are rather large, and those of the maximum and minimum are of different sign, and increase the daily range of temperature by 1·0°.

Mr. Clark is an excellent observer, and the work at the station is well done.

For report on anemometer, *see* page 76.

J. A. C.

Oxford, September 11th.—(Report not received.)

Pembroke (*St. Ann's Head*), September 26th.—The observer's reading of the observing barometer was lower than my reading, his reading of the spare barometer somewhat higher.

The position of the thermometer screen and rain gauge has been changed since last inspection to a site selected by the Secretary, near the lower lighthouse. The screen, a new Stevenson's, required painting. Mr. Dunsford promised to have it painted soon. The graduations on the thermometers required re-blacking, many of the divisions being undiscernible to me until I had blackened them.

C. H.

Scilly, July 23rd.—The barometer had been shifted from its former site to the signal tower, where it stands in a room without windows, and only lit through the doorway. The thermometer screen is new and occupies the old site. The barograph was much in need of cleaning, and the pen required cleaning also. The observations appear to be taken punctually and carefully.

For report on anemometers, *see* page 76.

R. H. C.

Spurn Head, September 10th.—Everything was in good order at this station, and the observer appears careful and anxious to do well.

The sand had gathered under the thermometers, and I directed that the screen should be raised.

A new assistant lightkeeper has recently been appointed, and I impressed on the observer the necessity of carefully training him in the work of taking the observations and making up the daily telegrams.

J. A. C.

Scotland.

General Remarks by Dr. Buchan.

Report of Inspection of Scottish Stations for 1902.

Barometer.

The barometers at the stations in Table I., from Dundee to Wick, were compared with inspector's standard barometer, No. 690, which I regret to say was broken in crossing the Pentland Firth to Orkney. From Deerness to Wolfelee all that was done was to see that the observers read their barometers correctly. The intercomparison of the barometers at Stornoway, which had been moved to new positions during the year, indicated they had been removed without accident. The barometers at Leith and Ochtertyre, which were inspected after my return to Edinburgh, were compared with the standard barometer of the Scottish Meteorological Society, No. 938, and found correct. The Table on page 81 gives the comparisons with No. 690 or No. 938, the readings of the station barometers not being corrected except for differences of readings of the attached thermometers.

Thermometers.

The thermometers were read twice, first by the observer as they hung in the thermometer screen, and then by the inspector after being in water along with the standard thermometer, for the required time. Special attention was given to the action of the maximum thermometers, and also to the state of the minimum thermometers. As regards the latter, about 1° of spirit was lodged near the top of the tube at the stations Nairn and Cally, and about 2° at Marchmont. These were rectified.

Hygrometers.

Special attention was given to the readings of the dry and wet bulbs, as they hung in the thermometer screens, immediately when the screen was opened, with the result that these thermometers, at all the stations, were in good order for hygrometric observations.

Aberdeen, August 5th.—The instruments continue to be kept in excellent order, and the observations are made with praiseworthy care and accuracy, but care is not taken to transmit the observations to London in proper time.

A. B.

Leith, September 23rd.—The instruments, with the enclosure recently repaired, were in very good order, and the new observer, Mr. Bottrill, made the observations and did the reductions correctly and expeditiously.

A. B.

Nairn, August 9th.—It was found on examination that Miss Penny's objection to maximum thermometer No. 32 arose from the circumstance that on rare occasions it read about 1° lower than the dry bulb at the same time, she not being aware that the dry bulb reads nearly one degree too high. But, as stated in previous reports, the faultiness of this thermometer is that the degrees are not etched on the stem.

The minimum thermometer was found to be out of order, fully a degree of the spirit was lodged near the top of the stem, in a position not easily seen, owing to the iron clasp. Miss Penny set it right in my presence.

Otherwise the instruments were in remarkably good order, and the greatest care is taken in making the observations.

A. B.

Wick, August 13th.—Owing to two recent paralytic shocks, Mr. Sinclair is now all but invalided, but is still interested in the work, and gives what help he can. Under Miss Sinclair's management the instruments were in excellent order, and her journal shows that the observations are made with intelligence and correctness.

A. B.

Stornoway, August 19th.—The barometers were removed to Mr. Mackenzie's new house in Scotland Street in the spring, and, judging from the readings of the two barometers, and the monthly averages since, the removal has been made without accident. The rain gauge will be removed to the place selected for its new position when the present crops, potatoes, &c., are off the ground.

The instruments were in very good order, and the observations are made with commendable care, correctness, and fulness.

A. B.

IRELAND.

Birr Castle, September 12th.—The observing barometer at this station reads ·014 of an inch too low. Mr. J. L. Roe now takes the observations for telegraphic reports, those relating to the Second Order Station being taken by Mr. G. A. Roe, who is comparatively new to the work, but is progressing towards efficiency. I explained to Mr. J. L. Roe, in reference to readings of dry and wet bulbs, the rule to be adopted when telegraphing in dealing with fractions of a degree, and the exception to be made when almost complete saturation is shown. The instruments in use were all in good condition, but the spare barometer is out of order.

C. H.

Blacksod Point, September 16th.—The observer, Mr. Marshall, called my attention to a difference of 1° between the readings of the dry bulb and minimum thermometers, which he reported to be constant. For some time past he has applied a correction of + 1° to the readings of the minimum. By comparison with my standard thermometer, the dry bulb read 0·2° too high, the minimum 0·6° too low. The instruments in use at this station are in good order.

C. H.

Donaghadee, September 18th.—The "check" barometer read more nearly in accordance with the standard than the "observing" barometer, and might therefore be used for observing in preference.

The thermometers are fairly correct, but the difference between the corrections for the wet and the dry bulb is rather large.

The rain gauge should be replaced by one with a stronger rim and deeper base, and the gauge should then be more firmly set and the grass allowed to grow in the 3 ft. square surrounding the gauge. At present the potato crop comes close up to it.

The reports are noted in the Office as very good, and the inspection confirmed the note.

The station is in charge of five men, W. Keown, chief; as changes are frequent all five practise reading, and any one may take charge in the absence of the others. Keown's barometer setting was below mine, Easton's slightly above; the extreme difference between the two was ·012 inches.

As regards the reading of thermometers, I pointed out to one of the observers that the degree nearest to the reading should be entered if the decimal is not given, not the degree next below the reading.

W. N. S.

Malin Head, September 24th.—The observer, Mr. Hailstone, was away, and the assistant, Mr. Doherty, was in charge. The condition of the apparatus was not a credit to the Office. The screen door was broken off at the hinges; the graduations of nearly all the thermometers were illegible. There was an unmistakeable deposit on the wet bulb when the coating was removed. There was detached spirit in the tube of the minimum thermometer. The turf had been removed from the enclosure containing the screen, and black soil with a few weeds remained. The screen tubes of both barometers were broken. The rain gauge was neatly fixed in a square of cement and is well arranged, except that it is now surrounded by cement and not by grass. It would appear that the observer is not sufficiently interested to conduct the work in the way it ought to be conducted. I left appropriate instructions with Mr. Doherty. I also ascertained that 8 a.m. (Greenwich) is the hour of morning attendance in winter, so that there ought to be no delay in the telegrams on that account.

W. N. S.

Roche's Point, September 23rd.—The observer at this station, Mr. James Mountjoy, whose appointment to the Post Office was temporary, expects his relief shortly. He has become an efficient observer, and promised me he would spare no pains in instructing his successor in the work required by the Meteorological Office. The bearings used for determining the direction of the wind, and considered by the observer to be true bearings, are in reality magnetic.

C. H.

Valencia, August 19th.—The thermometers, rain gauge, &c., were all in good order. The screen has been recently painted. There is nothing special to note.

For report on self recording instruments, *see* page 74.

E. G. C.

Climatological Stations.

Normal Climatological Stations.*—(Second Order Stations of the International Classification.)

England and Wales.

Belvoir Castle, September 17th.—Mr. Divers was from home at the time of my visit, but I saw the two assistant observers, who are both intelligent men, and who both read the instruments accurately.

The instruments were all in good order, but the thermometer screen stood over bare earth. It was promised that grass should be laid down under it at once.

J. A. C.

Birmingham (*Edgbaston*), July 31st.—The instruments are in fair order and the observatory is a very useful one. The grass minimum seems to be inaccurate and should be replaced. The screen should be repainted. The observer takes intelligent interest in the work, and conducts the observations excellently. The daily cards, reporting 9 p.m. observations, have been sent to the Office for the past 18 months. The observer called the Inspector's attention to remarkable differences between the Jordan and Stokes recorders, which could not be attributed to the uncertainties of photographic paper, and will send both sets of cards to the Office for inspection in future.

W. N. S.

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* A normal climatological station is one at which readings are taken each day at 9 a.m. and at 9 p.m., local time, and which is provided with the following instruments, properly verified and exposed:—Barometer, dry bulb, wet bulb, maximum and minimum thermometers, and rain gauge.

Blackpool, July 18th.—The instruments had been moved to the site selected at the last inspection. The sunshine recorder had been removed from the North Pier, and was mounted on a wooden staging about 20 feet above the ground, near the other instruments. The recorder was not in proper adjustment for time, being about 10 minutes slow.

The thermometer screen required painting.

A Negretti and Zambra self-recording rain gauge (which was formerly in use at Seathwaite) was placed alongwith the other instruments, but it required some re-adjustment. A Dines' self-recording pressure-tube anemometer had been erected on the pavilion of the North Pier. It would be an advantage if the "head" of the anemometer could be carried up higher.

For other reports, *see* pages 75 and 78.

W. J. M.

Buxton, August 16th.—The substance used with the wet bulb thermometer was a piece of bandaging. I recommended that muslin and cotton be employed. As the maximum thermometer had three air specks in the column, I recommended that special attention should be paid to the setting of the instrument in order to prevent too high a reading being registered. The column of mercury forming the index was very long, and it seemed probable that the air speck might work down into the bulb at low temperatures.

I explained to the observer how the measurement of snow should be effected.

The Jordan sunshine recorder was not in proper adjustment, being set for lat. 57° instead of 53°, and being also slow in time.

W. J. M.

Cambridge, August 6th.—Observations reported as very good. The thermometer corrections are rather beyond admissible limits, the daily range being increased by the extent of 1·6° F. by instrumental errors.

The sunshine recorder is losing some of its record on account of the growth of trees on the S.E.

There is a small anemometer in action, but its readings are not taken.

W. N. S.

Cheadle, August 14th.—This station was in good order. On comparing the thermometers it was found that the dry and wet had both gone up 0°·2. The grass minimum thermometer had some spirit up the tube. This thermometer is sometimes difficult to read owing to moisture getting in between the tube and the outer jacket. The grass minimum thermometer in use some time ago read too high. It was sent to Casella for examination, but was broken in transit.

W. J. M.

Cockle Park (*Morpeth*), September 2nd.—Everything was in excellent order at this station, and Mr. Farquhar, the new observer, who is the scientific assistant at the farm, will, I think, make a very good observer. He is, however, new to the work, and needed instruction on some points, which I gave. He reads the instruments quickly and accurately. Both he and Mr. Bell, the farm manager, take much interest in the work.

For report on sunshine recorder, *see* page 78.

J. A. C.

Darwen, September 8th.—There had been delay in sending to the Office the returns from this station, which I was sorry to find had arisen from the serious illness of Mr. Mainland. All the details of the observations are carefully watched, and all the instruments were in first-rate order. Mr. Mainland contemplates resigning his position at the close of this year, and the loss of so enthusiastic an observer will, I fear, be somewhat difficult to make good.

R. H. C.

Durham, September 5th.—Professor Sampson, M.A., was absent from Durham at the time of my visit, but I saw Mr. F. C. H. Carpenter, the observer.

The instruments were all in good order, and Mr. Carpenter is a competent observer.

The rain gauge is still at more than the usual height above the ground. I suggested that it should be lowered from 3 ft. 4 in. to 1 ft.

I pointed out a number of small discrepancies between the returns as sent to the Office each week and those received at the end of each month. These appeared to be due mainly to errors in applying the corrections, and it was promised that care should be exercised to avoid similar mistakes in future.

For report on sunshine recorder, *see* page 78.

J. A. C.

Fulbeck, September 15th.—The instruments were all in good order, and Rev. Vere F. Willson, M.A., the observer, takes much interest in the work. The thermometer readings are still taken to whole degrees.

In Mr. Willson's absence the barometer is read by Miss Watts. I tested her setting of the instrument, which was satisfactory.

J. A. C.

Garforth, September 3rd.—This promises to be an excellent station; its position is all that could be desired, and the instruments are very well placed. Mr. Smith, who is the observer, is much interested in the work, which is superintended by Mr. Ingles, of the college staff, and will, I think,

prove a capable observer. The mercury of the maximum thermometer travelled up the tube before the instrument was placed in a horizontal position, and I therefore had it sent back to the Meteorological Office for exchange.

R. H. C.

Hillington, August 26th.—There was no change in the zeros of the thermometers. The grass minimum had some spirit up the tube. I shook most of this down, but could not get it all down.

I recommended that close attention be paid to the working of the wet bulb thermometer. Mr. Ffolkes was away in Italy during the first half of this year on account of health, and during that time the observations were taken by the gardener, who, unfortunately, did not keep the wet bulb in good working order.

W. J. M.

Hollesley Bay, July 23rd.—All the instruments were (except the grass minimum) in excellent order, and are receiving marked attention. Screen was blown down early in year, but has been carefully reinstated, and new excellent instruments obtained. The instrument last received is defective and a new one is needed. The temporary expedient is not at all a scientifically constructed instrument. Professor Thonger is most desirous of doing good work.

Lowestoft, September 2nd.—There was no change in the zeros of the thermometers. The sunshine recorder was not in proper adjustment for time. The trees and shrubs have grown, and are still growing; if they do not already, they soon will, cut off some of the sunshine. I, therefore, recommended that the sunshine recorder be raised so as to be clear of any possible obstruction.

The direction of the wind is taken at the upper lighthouse, and the force of the wind at the lower lighthouse. I recommended Mr. Edwards to take the direction and the force of the wind himself, and to compare the results with those at the lighthouses.

W. J. M.

Llandudno, .—The daily forecasts for the district are copied on printed forms, and are exhibited at most of the principal points of the town. I did not see the daily report displayed.

R. H. C.

Plymouth, August 15th.—Everything at this station appeared to be in a very satisfactory condition. The attention of the observer was drawn to some recent errors in the hygrometrical deductions. These calculations are made by the assistant observer, who was absent at the time; Mr. Prigg undertook to draw his attention to it.

Mr. Prigg is willing to send 9 p.m. observations on post cards for insertion on page 4 of the Daily Weather Report.

The cards would be delivered in London by the second morning post.

F. J. B.

Prestwich, September 6th.—The barometer had recently been broken and had been away for repair. At the time of my visit it had been re-verified, but had not yet arrived from Kew. All the other instruments were, as usual, in excellent order, and under Dr. Clunn's care the routine of the station is evidently carried out with the intention of making the observations as good as possible.

R. H. C.

Rounton, July 10th.—The observer has some difficulty with the wet bulb thermometer in frost, but I explained to him how to act under such circumstances. The index of the Phillips maximum thermometer is smaller than in most similar thermometers. The grass minimum thermometer was 0°·8 too low.

W. J. M.

Scarborough, July 8th.—The minimum thermometer had an air bubble in the column of spirit, which I removed. The bright bulb thermometer had 3°·2 of mercury detached from the column. The sunshine trace was not running parallel with the card. As there was no sunshine at the time of my visit, I was not able to re-adjust the recorder. The observer did not appear properly to estimate the force of the wind nor the amount of cloud. I urged him to adhere to the scales authorised by the Royal Meteorological Society.

During the present year observations have also been made at the Manor Road Nursery. This is a much better site than the present one at the Peasholme Allotments, the ground being level and the exposure very good. I recommended that the present station be discontinued at the end of this year, and that the new one at the Manor Road Nursery be made the recognized station.

For reports on fishery barometer and sea temperatures, *see* page 73.

For report on sunshine recorder, *see* page 78.

W. J. M.

Seaham, September 4th.—Everything was in good order at this station, and Mr. Aird, who has had many years' experience, is an excellent observer.

The thermometer corrections at present employed are not supported by my comparisons.

J. A. C.

Sheffield, September 12th.—The grass minimum thermometer has been lowered as suggested on last inspection, and its exposure is now normal. All the other instruments were clean and in good order, and the observations are conducted in an admirable manner under the superintendence of Mr. Howarth, the Curator of the Museum.

For report on sunshine recorder, *see* page 79.

J. A. C.

Southampton, August 21st.—A new observer, Mr. S. Vaughan, has been appointed since the last inspection in 1900. He appears to take considerable interest in the work, and the instruments in his care were all clean and in good condition. The maximum thermometer showed, however, the large error of + 1°·0.

For report on sunshine recorder, *see* page 79.

F. J. B.

Wakefield, August 20th.—The instruments were in good condition. By special permission of the Governor of the prison, I had the opportunity of seeing the observer take the evening observations. I had not seen this observer before, as he is always resting in the daytime. I urged that special attention should be given to the wet bulb thermometer during frost.

On comparing the thermometers it was found that both the dry and wet bulbs had gone up 0°·1.

W. J. M.

Woburn, July 25th.—Instruments all well exposed and observer excellent. The 9 p.m. observations can now be resumed, and, as far as observer was concerned, inspection was almost unneeded.

F. G.

York (*The Museum*), September 8th.—A new roof has been supplied to the thermometer screen, which is now satisfactory.

All the instruments were in good order, and the observations are conducted by Mr. Wright under the superintendence of Mr. Platnauer, B.Sc., with care.

J. A. C.

SCOTLAND.

Cally, August 27th.—About 1°·0 of the spirit of the minimum thermometer was found at the top of the tube, which the observer, under direction, rectified, otherwise the instruments were in good order and evident care taken in making the observations. The liability of making errors of 10°·0 and 5°·0, &c., was pointed out, with the desirability of comparing the entries in journal again with the thermometers before closing the screen.

A. B.

Cargen, August 28th.—The observations continue to be carefully and intelligently made, and the instruments are kept in very good order. Colonel Dudgeon gives much attention personally to the observations.

A. B.

Deerness, August 14th.—The instruments are kept in very good order, and the utmost care is taken to make the observations as complete and accurate as possible. The wooden posts for the anemometer were found to be rotten on the west or weather side of the little erection. The necessary repairs were ordered to be made forthwith.

A. B.

Dundee, August 4th.—The instruments were all in good order, and the observer takes much care with the observations as respects punctuality and correctness in observing.

A. B.

Dunrobin, August 12th.—The instruments were all in very good order, and much care and attention is given to the work of observing.

A. B.

Fort William, August 20th.—The instruments were in very good order, and the observations were carefully and correctly made. Mr. Bee, who commenced duty as one of the staff of the two observatories at the time of last inspection, read all the instruments and made the reductions required expertly and correctly.

For report on sunshine recorder, *see* page 79.

A. B.

Gordon Castle, August 8th.—The observations are very carefully and intelligently made, and the instruments continue to be well kept. Exceptional eye-observations of weather will be recorded more fully in future. It is proposed to add a sunshine recorder to this station shortly.

A. B.

Lairg, August 11th.—After the Rev. Mr. Macraes' removal from Lairg to Edderton the observations were taken by the substitute, from whom I received the journal down to August 11th. The new observer, the Rev. Mr. Maclean, was instructed in handling the instruments, and generally in the methods of observing. A new rain gauge and a minimum thermometer have since been sent.

A. B.

Marchmont, August 30th.—Mr. Wood, the observer, was unfortunately confined to his bedroom with a very severe cold. There were 2°·0 of spirit lodged near the top of the tube under the clamp. This was put right, otherwise the instruments were in excellent order, and the journal of observations

showed that great care continues to be taken with the work of observing. The force of the wind, which for sometime has been entered too high, will be rectified in future, and the entries of the rainfall will be more clearly ciphered.

A. B.

Ochtertyre, September 26th.—The instruments were all in excellent order, and the observations are very carefully and fully made.

A. B.

Pinmore, August 25th.—A new rain gauge was procured in October, 1901, which, as well as the other instruments, were in excellent order. All were read correctly, except the barometer, which was set 0·028 inch too low. The proper method of setting the vernier was explained and understood.

A. B.

Poltalloch, August 22nd.—The minimum thermometer was out of order, and the index portion of the maximum thermometer (Phillips) was too long. Both instruments were at once sent to Edinburgh for repair, pending which the maximum and minimum thermometers, long in use at Glenlee, were used at Poltalloch. Otherwise the instruments were well kept and the observations made with punctuality and correctness.

A. B.

Rothesay, August 23rd.—The instruments were in excellent order, and the greatest care is taken to return on the monthly schedules a full record of observations.

A. B.

Wolfelee, August 29th.—On April 12th, 1902, the barometer was successfully removed to the observer's house by Captain Elliot Lockhart, the new position being, as ascertained by levelling, 50 feet lower. The instruments are well attended to and intelligently and carefully read.

A. B.

IRELAND.

Armagh, September 19th.—No special inspection was made. I looked at the instruments and the site. Everything was in good order. The trees, however, are growing up too high for the anemometer and the sun recorder. The composition tube leading from the rain gauge funnel to the cistern had burst and been mended with putty.

For other report, *see* page 77.

W. N. S.

Belfast, September 26th.—Observations are reported monthly to the Office, and weekly to the Registrar-General. They are sometimes referred to by engineers and for law cases.

The observations do not fully comply with the requirements of a normal climatological station. The irregularity in the hour of the evening observations, although less frequent than formerly, still exists. The Beaufort notation is used for reporting the weather instead of the international symbols. There are no observations of kind or amount of cloud, and the anemometer records are not to be relied upon without some periodical checking of the working of the instrument. A check of the direction could easily be made if the observer would note independently the direction at the hour of observation and compare his notes with the marks on the instruments. Some estimate of the performance of the instrument with regard to wind velocity could also be made by estimates of the force according to the Beaufort scale made at the hour of observation. On glancing at the observation book I was surprised to note only one entry of thunder, and none of lightning, among the daily observations extending over a period of upwards of two years.

W. N. S.

Glasnevin, Dublin (*The Botanic Gardens*), September 9th.—All the instruments at this station were in good order. Some shelter is given to the rain gauge from eastward by a wooden post, which Mr. Moore decided to move.

C. H.

Dublin (*Phœnix Park*), August 16th.—The thermometers, rain gauge, &c., were in good order; Corporal Blackmore has resigned, and the observations are now taken by Corporal Rose, who seems to take much interest in the work, and should make a good observer.

The Stevenson screen (as well as the anemometer) requires painting, and it was arranged that it should be soon done.

For report on anemometer, *see* page 77.
For report on sunshine recorder, *see* page 79.

E. G. C.

Dublin (*Phœnix Park*), September 9th.—During the afternoon I visited Colonel Sims, R.E., who showed me the instruments under his charge. The observer here—a non-commissioned officer—is making a brass platform, with adjusting screws, for the sunshine recorder, which will overcome the difficulty he has experienced in keeping the instrument level.

C. H.

Markree, September 22nd.—The instruments have become somewhat dilapidated. The mercury in the cistern of the barometer has become fouled; there seemed to be a piece of wire floating upon it. It is in consequence difficult or impossible to take accurate readings. The china mountings of the thermometers are broken in many places, and apparently are only held together by the screws that attach them to the wooden blocks in the screen. These require renewal. The funnel of the rain gauge dips into a glass, the bottom of which is too thick to allow the funnel to take up its proper place. The thermometer screen is of single louvres but quite serviceable. The observer, J. Armstrong, is much interested in the work, and will probably become in time quite competent to take charge of the instruments, including the sunshine recorder. He is at some disadvantage with the instruments in their present condition, especially with the barometer.

W. N. S.

Parsonstown, September 12th.—For report, *see* page 63.

Other Climatological Stations.

England and Wales.

Ackworth (*The Friends' School*), September 11th.—This is a proposed new station of the second order. The observer, Mr. E. B. Ludlam, B.Sc., is the science master at the school, and is very anxious to get a station established. The outfit of instruments is not quite normal, but may be accepted as satisfactory, and the exposure is good. As far as I could judge, the arrangements made, and proposed to be made, indicate that a useful station can be maintained here. The usual difficulty experienced in schools with regard to holidays will be met by the employment (and payment) of one of the resident officials during the vacations. The school is a large one, with some 300 boys and girls in residence, and it has extensive buildings and grounds.

J. A. C.

Alnwick Castle, September 1st.—The instruments were clean and in good order, and the observations appear to be carefully and intelligently conducted. Mr. Thompson, the head gardener, has charge of the work, under the superintendence of Mr. R. Kyle, the Constable of the castle. Mr. Thompson, though newly appointed to his present post, has had previous experience of meteorological observations.

For report on anemometer, *see* page 75.

J. A. C.

Bawtry (*Hesley Hall*), September 13th.—The instruments used for the observations sent to the Office were all in good order. I thought the arrangement of the thermometers in the screen somewhat inconvenient for reading, but Mr. Whitaker is accustomed to it and preferred to make no change.

Mr. Whitaker has a Richard barograph, and he has recently purchased a small dial anemometer, which is erected in an open position in the new gardens.

J. A. C.

Felixstowe, July 22nd.—There is no barometer at this station. Thermometers are in a fairly good position in a proper (improved Stevenson's) screen—somewhat sheltered on its eastern side. Rain gauge also fairly well exposed, but might be better. Sunshine recorder very badly exposed; sheltered by vicarage on one hand and (less seriously) by schools in west; not at all a good position. Alteration proposed to improve matters, but I fear no position in these grounds can be at all good, although the lawn affords good exposure for thermometers.

F. G.

Harrogate, September 6th.—I visited the station with Mr. Paul. It has an excellent exposure in Bog's Field near to Harlow Moor, about three quarters of a mile from the centre of Low Harrogate, on a high ridge. The exposure would be rural not urban, and it is perhaps 100 feet above the lower part of the town. The instruments are of the best kind and well looked after. Two thermometer screens, a Campbell Stokes universal recorder and a Jordan recorder, on the roof of a small hut, all within a pale fence. Rain gauge, 5 in. Evaporation gauge and check rain gauge, 8 in. Earth thermometers at 1 ft., 3 ft., and 4 ft. A six inch exposure of earth thermometer was given up because it followed the air temperature so closely. The 1-ft. earth thermometer just penetrates the underlying rock; the others are well in the rock. Two solar radiation thermometers and a grass minimum. Mr. Marriott had visited the station this year. I only made a complimentary visit.

W. N. S.

Hawarden Bridge, September 12th.—A change of site has been made here since last year, and the observations are much improved thereby. A new 8-inch rain gauge has also been substituted for the inefficient recording gauge formerly in use.

R. H. C.

Littlestone-on-Sea, July 19th.—A new observer (F. Simmonds) was at work. The solar and terrestrial radiation thermometers had not been replaced. Observer appears to be very capable and careful, and I explained to him the desirability of reading his thermometers to tenths of a degree and he readily assented when instructed. Checked all "bearings," &c., and estimate of wind direction and force.

F. G.

Lytham, September 11th.—The present observer was new to the work, and I found that delay in sending in returns had been due to this cause. The instruments were all in good order and are, I think, carefully read. I found in Dr. Fisher's house a Fortin barometer, which proved upon comparison with my standard to be a very good instrument, and in future readings of this instrument are to be substituted for those of the fishery barometer hitherto used.

R. H. C.

Rauceby, September 15th.—The rain gauge had been removed to the new position selected on last inspection. It is still somewhat sheltered by plants, and I requested that the high plants should be removed, and that in future only low crops should be planted around the gauge. This it was promised should, as far as possible, be done. Mr. Hope read the thermometers quickly and accurately, and I think he makes a good observer.

For report on sunshine recorder, *see* page 78.

J. A. C.

Rhyl, September 13th.—Since last year this station has had a complete outfit of new instruments, but at the time of my visit they had not been properly mounted. Mr. Goodall, the surveyor, under whose charge they are, undertook that they should be set up as I suggested, and then the station should prove a very good one indeed. The exposure of the instruments is excellent. Some needed instruction was given in reading the instruments.

The daily weather report sent to this place is exhibited very prominently outside a chemist's shop in the principal street, a frame having been prepared for it, and a red mark being drawn around the forecast for the district.

I watched it for some little time and saw it being consulted by a large number of people; at times there was half a dozen people looking at it at once, and during the time I was there (morning) it was scarcely ever without one or more examining it.

R. H. C.

Rothamsted, July 23rd.—The station is well equipped for rainfall observations as the 1·1000-acre gauge is available for comparison. The observations are made by Mr. Grey under Mr. Wilson's instructions, and he is very intelligent and a good observer. The barometer is old, and the screen is also of an ancient pattern and sheltered by a large cherry tree.

W. N. S.

Southport, September 11th.—Although I did not officially inspect this station, I visited it and was much impressed with the completeness and excellence of its instrumental equipment, and with the care which Mr. Baxendell bestows upon it to secure efficient observations.

R. H. C.

SCOTLAND.

None.

IRELAND.

Dundrum (Lynton), Co. Dublin, September 10th.—The observer, Dr. Arthur S. Goff, was absent from home when I called. His friend, Dr. Usher, showed me the instruments in use—maximum and minimum thermometer and a rain gauge. The thermometers hang against the wall of his house, facing east, and are not well protected. The rain gauge is not well placed, being partially sheltered from northward by a high wall situated 7 feet from the instrument. It would not be desirable to accept the observations with the instruments arranged as they are at present.

C. H.

Foynes, September 19th.—The screen here required securing. Mr. W. H. Ward, the observer, said he would have this seen to. Wire fencing and long grass somewhat shelter the rain gauge in driving rain from eastward—N.E. to S.E. Mr. Ward said he would ask Lord Monteagle's permission to move the instrument to a more suitable position. Lord Monteagle, unfortunately, was not at home when I called.

C. H.

Killarney, September 22nd.—The instruments are in good order, but the maximum thermometer reads 1°·5 too high. The thermometer screen has not been changed. In driving rain from a S.S.E. direction some shelter to the rain gauge would be afforded by a tree.

C. H.

Kingstown, August 23rd.—The thermometers, rain gauge, and barometer are in good order.

It has not yet been found possible to arrange for 9 p.m. observations of the thermometers in the Park Gardens, but Dr. Power is willing to take observations at that hour at his residence, if dry and wet thermometers could be fitted up outside the window.

This position, I am afraid, would not be satisfactory, as the window faces E.S.E., and is some 10 feet above the ground, and there is not sufficient depth for an ordinary Stevenson screen.

There is a grass plot in front of house, bordered by the public road.

E. G. C.

Limerick, Corbally, September 19th.—The rain gauge is under partial shelter in driving rain from north-westward by a very high tree, but is in the best position available. Mr. Poole Gabbett has a new 5 inch Snowden, with which he will replace the old bottle pattern gauge in use.

C. H.

Limerick, Roxborough, September 19th.—Mr. A. N. Shaw was absent from home. I was attended by his observer—the head gardener. The exposure of the thermometer screen was impaired by the growth of sweet peas on either side of it. The row on the east side was only 4 feet distant from the screen, and grew to a height of 5 feet. There are two rain gauges, a 5-inch and an 8-inch ; the former is a Snowden ; the latter is made of iron and painted ; it is of an old pattern. A wire-fence from 3 to 3½ feet high running N.E. and S.W., 2½ feet distant from these gauges, affords them some shelter in driving rain from north-westward.

C. H.

Mallaranny, September 13th.—The rain gauge was not so well placed as it might have been, being somewhat sheltered from westward in driving rain by a high mound and boulder. Round it grass and heather grew to the level of the rim.

Miss Kilsby said she would have it moved to a position suggested by me.

C. H.

Newcastle, Co. Wicklow. Hospital for Consumption, September 11th.—Since last inspection, in 1900, the distance between the rain gauge and the screen has been increased from 6 feet to 12 feet, so that the former now receives no shelter from the latter. The grass immediately round the rain gauge, as well as that under the screen, was too long ; Dr. Steede will have it kept short in future. Dr. Steede's many duties do not permit him, on some occasions, to observe exactly at the time required. He hopes in future to record observations of cloud form.

C. H.

Stations contributing to the Returns issued by the Registrar-General for England.

I deemed it desirable that, as far as might be conveniently possible, these stations should be seen by representatives of the Office this year, in order that information might be available by the Council as to the conditions under which the observations were being taken. The notes made by the Inspectors are as follows :—

Barnstaple, August 16th.—The observations are made at the North Devon Athenæum by Mr. Thos. Wainwright. The barometer was out of repair, the rack and pinion of the vernier being broken, so that it was impossible to set the instrument accurately when the mercury was above 30·0 inches. I advised that it would be well to obtain a new one, and Mr. Wainwright promised that the matter should be brought before his Committee. The outdoor instruments are excellently exposed in the garden attached to the Institution—a large triangular piece of ground bordered on one side by public road, and on the other by the river Taw. I recommended that the thermometer screen (a Stevenson) be re-painted, and that the rain gauge be raised from its present height (only 5 inches) to a level of 1 foot above the ground. When these matters are attended to the station will, I think, be an excellent one.

F. J. B.

Bristol, August 18th.—The station—Over Court—is about five miles (as the crow flies) from Bristol, and is essentially a rural one, the observations made there giving, in all probability, an incorrect representation of the meteorological conditions prevailing in the city itself. The proprietor, Mr. R. C. Cann Lippincott, was away at the time of my visit, but I saw the gardener, Mr. Delbridge, who usually takes the observations. The outdoor instruments are well exposed in the park, the thermometers being in a Stevenson's screen. There is another set of thermometers in a large louvre-boarded structure, a cage for exposing ozone papers (now disused), and three rain gauges, and it is evident from the equipment of the station that Mr. Lippincott takes considerable interest in the subject. The barometer is of the Fitzroy type in a wooden frame, but no barometrical observations are supplied to the Office. The station appears to be upon the whole an efficient one.

F. J. B.

Bradford, September 4th.—This station is situate in the centre of Bradford, where there are insurmountable difficulties in securing a good site, and as the result the *locale* of the instruments cannot be described as satisfactory. Access to them all is difficult, and the rain gauge cannot be reached for examination in the usual way. The series of observations covers a period of several years, and Mr. Johnson's interest in them is shown by the trouble he has taken to do the best his difficult surroundings would admit of.

R. H. C.

Carlisle, August 28th.—The station is at the Cemetery, 1½ miles south of Carlisle, well above the city, and about 114 feet above sea level.

The Cemetery is liberally planted with flowers, shrubs, and trees, but they do not interfere with the rain gauge or thermometer screen, which are in a small railed enclosure.

The screen is a small double-cased wooden hut or hood, open to the north. The boards are set so as to give access of air, and the depth from back to front is sufficient to keep the sun off the bulbs when it goes north of the east and west line.

Thermometers, dry and wet, about five feet above ground.

Rain gauge on a high column, rim about four feet above ground. Eight-inch tin plate gauge (with earthenware catch vessel) getting rather the worse for wear.

Evaporation of equivalent of one inch of rain measured from shallow eight-inch can.

Barometer (Fortin, by Negretti) in moderately good order.

Observer has read the instruments for 23 years; very good observer. Station has been in existence for upwards of 40 years.

The station is in charge of the Burial Committee. Mr. Cartmell, the clerk, takes no personal interest in the observations, but is desirous on behalf of the Committee that they should be efficient and comply with Office requirements.

The station is practically rural—not urban—and has satisfactory possibilities.

The rain gauge and screen should be replaced in course of time, if not immediately, particularly the latter. The position of the former is probably dictated by the consideration that the railings would interfere if the gauge were on the ground, as the enclosure is rather restricted. The general surroundings of trees and shrubs make it very likely that the added height above the ground does not interfere with the record as it would do in other situations.

W. N. S.

Halifax (*"Bermerside," Skircoat Green*), September 5th.—This is a station which has for some years been reporting to Mr. Glaisher for the Registrar-General. Mr. Gledhill, F.R.A.S., the observer, has charge of Mr. Edward Crossley's Astronomical Observatory, and possesses some excellent instruments, which are exposed in an extensive demesne. He was quite ready to bring his practice respecting the observations to agree with that adopted by the Office, but said he would not be able to add to those which he at present made.

R. H. C.

Halifax (*Public Library*), September 4th.—This also is a station sending returns for the Registrar-General. The equipment of instruments is good and the position very good, but some of the methods hitherto followed have not been in accordance with those desired by the Office. Mr. Whiteley expressed his willingness to fall into line with the Office requirements, and I think the station will then become a very useful one.

R. H. C.

Hull, September 9th.—This station is situate in the Pearson Park, where observations have been conducted for many years past. The outfit of instruments is complete and good, and includes a Stokes sunshine recorder now well placed. The thermometer screen needed painting, and both it and the rain gauge were a good deal sheltered by trees and shrubs. The screen needs raising about nine inches. The grass minimum and solar radiation thermometer were both exposed at six inches above the ground. I think the station will fairly represent the conditions of Hull. The observer, Mr. H. B. Witty, is anxious to make the station a thoroughly efficient one.

J. A. C.

Huddersfield (*Edgerton Cemetery*), September 5th.—The observer here is Mr. J. Firth, who has taken up the work commenced several years ago by his father. The position of the station in the Cemetery is excellent, but the necessity for making it as little obtrusive as possible detracts somewhat from its value. Mr. Firth's practice has not been quite that followed by the Office, but he is willing to conform as far as possible to the recognized rules. At present he has no dry and wet bulb of the ordinary pattern, but uses maximum and minimum thermometers for those observations. The barometer is a "Fishery" instrument, and is kept out of doors in a case erected for it near the thermometers. The record kept shows that great care is bestowed upon it, and Mr. Firth is evidently anxious that his observations shall be as good as possible.

R. H. C.

Leeds, June 16th.—This is a roof station of a very pronounced type in connexion with the Museum of the Philosophical Hall, and does not compare with other exposures that I am acquainted with, nor do the hours of observation correspond with those of other stations. The observer is competent, and compiles a meteorological summary for Leeds and neighbourhood, giving sunshine records for a number of stations. A beginning might be made by getting the barometer put in order, and this might be done if a barometer were lent temporarily during the repairs. Arrangements should then be made to get a proper station established, with normal exposure and normal hours. There seemed to be not much prospect of improvement, for want of funds.

W. N. S.

Nottingham, September 16th.—The instruments are at Nottingham Castle, which is now used as a public museum. The thermometer screen and rain gauge are in a railed enclosure on the level plateau on which the castle stands. The position is satisfactory as far as temperature is concerned, but some rain must, I think, be lost. The outfit of instruments is excellent; but the screen, instead of being white, had been painted a dark green.

There is a second full set of instruments on the roof of the castle, about 76 feet above the ground, and these, too, are regularly observed. The barometer is a "Fortin," and hangs in the museum, while there is a spare instrument of the same make in Mr. Brown's office.

Mr. Brown informed me that he was not satisfied with the present position of the instruments, and that he was proposing to remove the station to a site in a public park, where they would have a much better exposure. I had not time to see the new site. I was informed, however, that the change will be in every way an improvement. The present observations may, in my opinion, be taken without hesitation as representing Nottingham, except as to rainfall, which is probably somewhat deficient.

J. A. C.

Preston, September 9th.—The position of the instruments is not at present satisfactory, but the instrumental outfit is good, with the exception of the barometer, which needs cleaning and repair, and I was shown an enclosure where a perfectly satistactory site could be obtained. Mr. Jackson, who takes the observations under Dr. Pilkington's superintendence, is anxious to improve them, and if a position was secured for the instruments in the Deepdale enclosure, the station would, I feel sure, become a very valuable one. Mr. Jackson's register of observations shows that he takes great care to record them accurately.

R. H. C.

Salisbury (*Wilton House*), August 19th.—This station, on the estate of the Earl of Pembroke and Montgomery, is about 2½ miles (as the crow flies) from Salisbury, and is like that at Bristol, essentially a rural one. The observations are made by Mr. T. Challis, the head gardener, but four of the under gardeners have been trained to take observations in turn. The scale of the barometer was very much worn and indistinct, but observer promised to have the instrument renovated. The outdoor instruments are well exposed in the kitchen garden, and were in good condition, but the minimum thermometer showed a very large error, being 2·0° too low. The screen is one of the Glaisher pattern. I advised that it would be well to obtain a Stevenson screen, and Mr. Challis promised that if a specification could be sent from the Office he would have one constructed, under the superintendence of the Clerk of the Works. Mr. Challis evidently takes much interest in the work, and I understand that Lord Pembroke makes occasional enquiries when the weather is of an interesting character.

F. J. B.

Truro, August 13th.—This station belongs to the Royal Institution of Cornwall, and the observations are made by the Curator, Mr. G. Penrose. The barometer is an old one by Barrow, and, although fairly accurate, needs cleaning and repairing. The outdoor instruments are on the leaded roof of the Institution. The thermometer screen is a large wooden hexagonal structure, the upper part of which is louvred, while the lower half is pierced with a large number of holes an inch in diameter; the circulation of air round the thermometers must, I think, be good. The heights of the various instruments above the ground and above mean sea level were obtained many years ago, and are not quite accurate. Observer promised to have them all verified by the local Surveyor, and to communicate the result to the Office. There is a Jordan recorder here (twin pattern), but its exposure is not perfect; in the winter time it must, I think, be interfered with by the Cathedral to the south-eastward, and only 150 feet distant.

In spite of the unorthodox exposure of the thermometers the station appears to be upon the whole a good one.

F. J. B.

Wrottesley Park, September 19th.—The barometer is a "siphon," by Troughton & Sims, about 60 years old, and in need of cleaning. The thermometer screen is a good deal warped, and the minimum thermometer has not been kept in the screen, but at some distance away and quite close to the ground. Excellent sites could no doubt be found for the instruments, but at present the arrangements are not in accordance with the Office rules. Mr. Simpson said he was willing to continue the observations already made, but owing to pressure of other work could not undertake to add to them. I was shown a number of volumes of Anemograms, obtained from a pressure plate anemometer, and of other meteorological observations made at Wrottesley going back to 1843.

R. H. C.

Fishery Barometer Stations.

Scarborough, September 8th.—I found this instrument in the custody of Mr. Appleyard, the Harbour Master, and exposed at the lighthouse on the middle pier. The vernier attached to the instrument does not work accurately, for on setting downwards the reading differs nearly ·02 in. from that obtained by an upward setting. There is no attached thermometer.

Compared with my standard the fishery barometer read 0·12 in. too low. The instrument was clean, and I was informed it is much used by the fishermen of the port.

The sea temperature observations are taken by the Coast Guard from the end of the inner pier, the thermometer being attached to a line and allowed to remain in the water for five minutes before being drawn up and read. The air temperatures returned on the same sheets are the readings of a thermometer hung without any screen on the wall of the Coast Guard Office on the parade. No sun can shine on the instrument in the morning, nor, I think, at any time during the day. At the same time there is a fairly free circulation of air around it.

The air thermometer agreed exactly with mine, while that used for the sea water read 0°·1 too high.

J. A. C.

Donaghadee, September 18th.—The instrument is at the railway station. It stood at 30·27 ins. att. therm. 63·0, at 3 p.m. It had been set at 30·22. There were globules of mercury adhering to the glass in the vacuum. The stationmaster was not at the station. No chart was exhibited.

W. N. S.

Elly Bay, September 16th.—I visited the Coast Guard station at this place and found the Fishery barometer there in perfect order. The fishing population is said to be small, but the barometer is found to be useful.

C. H.

Stations with Self-recording Instruments.

A.—Observatories (First Order Stations of the International Classification).

England and Wales.

Falmouth :— } (Reports not received.)
Kew :— }

Oxford (Radcliffe Observatory), September 11th–12th.—The self-recording meteorological instruments were all in excellent order and carefully looked after.

The usual examination and cleaning was carried out.

The sperm oil in the direction trough of the Robinson anemograph was fluid, but dirty; the bearings were cleaned and new sperm used. The inner part of the cover over the direction roller trough was painted to prevent rusting. The orientation was satisfactory.

The curves from the barograph and thermograph were very good, and there was nothing calling for special remark.

Since the last inspection the Newman standard barometer, No. 1220, has been cleaned, scale improved, mercury boiled, &c., but the index error was not known. I took down the Fortin standard barometer, No. 657, and a series of comparisons were made. The result of these gives the index correction of the Radcliffe barometer as + ·003 in.

E. G. C.

Stonyhurst College, August 29th–30th.—The curves from the self-recording instruments at this observatory appeared to be satisfactory. The anemometer was dismounted and cleaned. The oil for the direction rollers was dirty, and there was but little oil for the step bearing of the velocity shaft.

There was no M.O. sperm available, so I used some oil stored here, with the addition of a little paraffin.

The blades of the fan governors are becoming much worn, and new ones are wanted.

The orientation was satisfactory.

The spring fusee clock was examined and oiled.

Both barograph and thermograph, especially the latter, required cleaning, which was done; the temperature-bar was taken down and bearings cleaned, and lenses and mirrors examined.

The pin in the mitre-wheel spindle of the thermograph clock was almost cut through; a new one was fitted.

The rain gauge clock has not been quite satisfactory of late, and I found the pendulum beat weak and uneven. Clock was cleaned and oiled, a new line fitted, and its performance improved. The stopping may have been caused by the guide screws on the collar of the cylinder spindle having become rather tight. These were altered.

The discharger was in good order.

E. G. C.

Scotland.

Aberdeen :—(Report not received.)

For report on other instruments, *see* page 63.

Fort William :—(Report not received.)

For report on other instruments, *see* pages 63 and 79.

Glasgow :—(Report not received.)

Ireland.

Valencia, August 19th–21st.—The self-recording instruments at this observatory appeared to be working satisfactorily.

The anemometer was dismounted and examined. The oil in the direction well was rather thick and dirty.

The stays to the cup arms are becoming very thin in places, and will not last much longer. When new ones are supplied they should be of copper. The recording part was cleaned, and the clamping screw of the velocity spiral upright was altered to give more freedom, as the bearing has had a tendency to become jammed at times.

The fusee spring clock was cleaned and oiled.

The metallic sheets supplied have been too narrow for some time, and had to be fastened down with adhesive paper. To remedy this I removed the old clamp and had a larger clamp piece fitted on the "direction" side, and the sheets can now be properly adjusted. Every care appears to be taken with the metallic sheets, and I am afraid that with the present helices and papers the faintness of

traces cannot be prevented. The barograph and thermograph clocks were taken down and cleaned. The "temperature-bar" of barograph was removed and the bearings cleaned. The definition of the dry bulb light was slightly improved.

The clock of the Beckley rain gauge required a new cord, which was fitted, and all parts cleaned. A new pen and special ink for the gauge was supplied.

For report on other instruments, *see* page 64.

E. G. C.

B.—Anemograph Stations.

England and Wales.

Alnwick Castle, September 1st.—The clock, with the recording parts of the anemometer, had recently been cleaned by the local watchmaker, and as the instrument appeared to be working well I did not dismount it. I examined the exterior parts and found all in good order and well oiled. The orientation was correct.

I carefully compared the tracings prepared for the Office with the originals and found them correct. It must be observed, however, that the direction trace does not quite fit the form.

For report on other instruments, *see* page 69.

J. A. C.

Blackpool, September 10th.—While at this station I was shown a pressure tube anemometer which has recently been erected upon the North Pier. I gave the observer some needed instructions as to the management of the pen, and for adjusting the float, which was a good deal out. The records from this instrument, which is not far from the cup anemometer at Fleetwood, may at times be valuable for comparison with the Fleetwood records.

For report on other instruments, *see* pages 65 and 78.

R. H. C.

Fleetwood, September 9th–10th.—Mr. Gaulter and his son, who, I was told, acted as his deputy, were both away at the Isle of Man on holiday. In their absence Miss Hall, daughter of the caretaker of the Mount, was in charge of the instrument.

The new kiosk is considerably larger than the former building, both in area and height, and in its construction regard has been had to the requirements of the anemometer, which is placed on the top of the small dome which surmounts it. I estimated the height of the cups above the ground level to be 40 feet, but, as the Mount itself rises considerably above the general level of Fleetwood, they dominate everything in the neighbourhood, and have as good an exposure as an instrument of its weight, and with its limitations, can be expected to have.

I opened the exterior part, but did not think it needful to dismount the cups, especially as the wind was rather strong and gusty. The bearings, however, were all very deficient in oil, and the worm-wheel of the direction fans had been put together improperly, with the result that one end was grinding into the bearing, and causing a good deal of friction as well as undue wear upon the shoulder; this was taken down, the bearings properly arranged, and the fans reversed. Adjustments of the bearings of the bevilled wheels of the recording gear were also made, and the clock examined. After orientation the instrument worked very satisfactorily.

I would suggest that the Surveyor be asked to alter the door in the dome by which access is obtained to the instrument. It it were hinged at the bottom and secured by two chains at the top, so that it could be allowed to fall outwards to a nearly horizontal position, it would form a small platform, which would make it safer and easier to reach the instrument. At present one can only stand on the curved surface and hold on by the anemometer, and in a strong wind this is neither safe nor pleasant.

R. H. C.

Holyhead, September 15th–18th.—*Cup Anemometer.*—This instrument was entirely dismounted and cleaned. The spindle carrying the cups had again worked loose, and I now had it brazed and and again riveted before replacing it. Captain Kendall, Superintendent of the Dublin Mail Packets, very kindly had this done at the Company's engineer's shop, and told me he would be glad to do the Office a similar service at any future time. I again tested, in a strong wind, the position of the vane relative to the direction of the wind, and the result was similar to that obtained last year.

The steel work of the stand is very much rusted, and repainting of the whole stand is urgently needed.

In orienting the instrument allowance was made for the error of the vane.

Pressure Tube Anemometer.—This anemometer was in a more satisfactory condition than at any previous inspection, the water being quite clean and there being but very little deposit at the bottom of the container. The clock was cleaned and oiled, but the spring requires tightening a little, and I told the attendant if he failed to get it to keep better time the clock ought to be taken to a clockmaker to get the spring altered.

Some years ago I fitted to this instrument an arrangement for feeding ink to the pen from a small reservoir by means of a thread or two of wick. The arrangement has been in use ever since, and the uniformly good traces which Mr. Davies gets are, I think, due in great degree to it; it might perhaps be adopted with advantage elsewhere.

Pressure Plate Anemometer.—This was dismounted and carefully examined. The working of the chain is quite satisfactory, and the friction rollers, intended to prevent the plate from turning, act admirably. The vane blade was a good deal corroded, and I had it cleaned and painted. I found, however, a serious corrosion was going on in the bolts and nuts which hold the wire stays to the mast, and it has already proceeded so far as to make them very insecure. I asked Mr. Cotton to have them renewed without delay; in a gale of wind I fear the mast might not be safe.

The spring was re-adjusted and instrument left in good working order.

Bridled Anemometer.—This was also dismounted and cleaned in every part, including the clock. It is working satisfactorily, and the wheel-pen continues to give excellent traces. I did not on this occasion again test the zero of the scale.

General.—The instruments were all in very good working order, and show evidence of careful attention on the part of Mr. Cotton and Mr. Davies.

The whole of the masts and the woodwork again requires painting. As regards the metal work this is absolutely necessary, especially for the steel; but the action of the sea air and spray upon it sets up rapid oxydisation everywhere, which can only be guarded against by careful painting. "V.R." on notice board should be "E.R."

An order for the painting will be waited for before proceeding with the work.

For report on telegraphic station, *see* page 62.

R. H. C.

North Shields, September 3rd and 5th.—I found the instrument well oiled and in general good order, but, as usual, much in need of cleaning.

I dismounted both the internal and external portions, and cleaned it and the clock thoroughly, and then well lubricated it with fresh sperm oil and left it working well. I was asked to examine as to the cause of a "shake" in the traces. I did so and corrected the error as far as I could, but not, I think, wholly. The instrument is an old one and shows signs of wear.

I asked Captain Robson to be careful to keep the papers in a very dry place in future, so as to avoid, as far as possible, the faintness of the markings owing to dampness. Nothing has been done to improve the access to the vane and cups.

For report on telegraphic station, *see* page 62.

J. A. C.

Scilly, July 19th–24th.—*Pressure-tube Anemometer.*—This instrument was dismounted on the 21st. I found the water in the container clean, but the level was rather low, which probably accounted for the somewhat unsatisfactory records lately made with light winds.

The cover is partly unsoldered, but the opening is below the water-level and does not affect the working of the instrument; there was absolutely no sediment in the container such as has always been found on former occasions, although the water had not been changed for quite 12 months.

On refitting the instrument I had a good deal of trouble in placing the float guide. If the guide was screwed down in the usual way the motion of the float was checked, and when the float was raised by hand it became held fast by the guide; I had therefore to tilt the guide slightly to avoid this. I can only suggest that the cover has had a knock, but I cannot understand how a knock sufficient to cause such a fault could have been given; and I am also in doubt to what extent, and for how long, the injury may have prejudiced the record in the past; but there is no doubt it is connected with the obliquity upon the sheets of lines which ought to have been vertical—a fault to which I have several times called the observer's attention. The pinion on the clock which turns the cylinder was rather loose and had to be tightened.

When I left it the instrument was working well, but, I think, with a little more care and cleanliness in manipulating it better traces would be obtained. The difficulty seems to be that the observer never had to deal with instruments requiring nicety of adjustment until rather too late in life to fully appreciate what is required.

Robinson Anemometer.—This instrument was much in need of an overhaul, not having been cleaned for nearly two years.

It was entirely dismounted and every part, including the clock, examined and cleaned, and the time pricker was re-pointed and re-adjusted.

The direction-brake had only half the proper quantity of oil it, and the vane had in consequence been too free; the oil, after two years' use, was dirty, but still quite limpid and good. None of the parts show signs of undue wear, and notwithstanding its exposed position the instrument is still in very good condition. When put together again it worked very satisfactorily, and was yielding very good traces when I left.

The external parts require repainting, as does also the mast of the pressure-tube anemometer, and I left instructions for this to be done.

For report on telegraphic station, *see* page 62.

R. H. C.

Yarmouth, September 2nd–4th.—The anemometer at this station was in good order and is regularly lubricated.

The sperm oil was in excellent condition—clean and fluid.

The channel cut in the gun-metal cover of the oil cup on velocity spindle last year proved to be hardly deep enough, so I had the centre slightly countersunk, and the oil now runs freely to the cup.

The orientation was satisfactory.

The marking of the velocity pencil has not been quite satisfactory for some period, and I gave extra time to the recording apparatus and did the best I could with the old pencils.

The trace is improved, but I was unable to quite get rid of the horizontal line at the beginning of each revolution, but it is not so pronounced as before, and the marking is more distinct.

It would be a decided advantage if silver helices could be fitted to this instrument, as the traces in damp weather would be much better, and the curves generally would be improved.

There is no case or cover for the recording apparatus.

E. G. C.

IRELAND.

Armagh, August 27th–28th.—The Robinson anemograph at this Observatory is evidently regularly attended to and lubricated.

It was dismounted and all parts cleaned.

The oil was very dirty and thick, but the Inspector was unable to change it last year, owing to wet and stormy weather. It was removed and new sperm used. The worm on the direction fan-spindle is worn, and one of the *lignum vitæ* bearings is cracked, but not sufficient to necessitate a new one at present.

The orientation was satisfactory.

The clock was cleaned and oiled, and the pawl screw on barrel, which had almost worked out, was put right. The clock of the Beckley rain gauge No. 6 required cleaning, and a new cord was fitted.

On testing the action of the "Stonyhurst" discharger I found that the bottom copper disc had come right away from the cylinder, so that the discharger had not acted for some time. It was repaired and re-adjusted.

For report on other instruments, *see* page 68.

E. G. C.

Dublin (*Phœnix Park*), August 15th–16th.—The curves from the small Robinson anemometer at this station appeared to be satisfactory. The instrument was dismounted and cleaned. The oil in the channel for the direction ball bearings was thick and dirty, but that in the brake-box was much cleaner.

All was removed, and sperm oil sent from the Meteorological Office used.

The clock was dirty and wanted cleaning, and the rain had driven in through case-hole, and rusted the winding arbor. This was put right, and observer instructed to plug the opening. The clock was taken down and cleaned.

The orientation was satisfactory.

The base of each support of the stand has been faced for about three feet up to prevent further decay.

For report on other instruments, *see* pages 68 and 79.

E. G. C.

Kingstown, August 25th–26th.—This was my first examination of the Robinson anemometer here.

The recording part is modern, but the exterior portion is of an older type.

Owing mainly, no doubt, to the excellent cleaning, &c., it received last year, the instrument was on the whole in good condition, but the oil for the direction rollers was very thick and dirty. This was removed, all parts cleaned, and the sperm supplied by the Office employed, and it will be used for future lubrication.

The clock required attention, as it was dirty and had rusted in places. It was cleaned, and all left in good order, and as a substantial wood and glass case has been fitted over the recording apparatus, the clock, &c., should now keep in better condition.

Judging by the various flags and vanes in the harbour the vane seemed to be pointing well in the direction of the wind ; the velocity, however, was rather low.

Full particulars as to the position and surroundings of the instrument have been given by Mr. R. Curtis, and I thoroughly endorse his opinion that the value of the records would be much increased if the cups, &c., could be fitted on a lattice iron stand, say another 12 to 15 feet above the ridge of the anemometer house.

The Dalkey and Killiney hills to the S. and S.E. must affect winds from those quarters.

For reports on other instruments, *see* pages 70 and 79.

E. G. C.

C.—SUNSHINE STATIONS.

ENGLAND AND WALES.

Birmingham (*Edgbaston*), July 31st.—The observer called the Inspector's attention to remarkable differences between the Jordan and Stokes recorders, which could not be attributed to the uncertainties of photographic paper, and will send both sets of cards to the Office for inspection in future.

For report on other instruments, *see* page 64.

W. N. S.

Blackpool, September 10th.—The position of the lens in the bowl was not correct, and the azimuth adjustment was also faulty, but owing to the weather I was afraid to dismount the instrument to correct it, and I therefore explained to the observer how he should proceed, and subsequently sent him the time corrections for several days to assist him. The exposure of the recorder is very good, but I was told it is proposed to establish a new station a short distance away, which it is thought will prove more suitable for all the instruments.

For report on tube anemometer, *see* page 75.

R. H. C.

Bournemouth, August 20th–21st.—There are three recorders here—a Campbell Stokes and a Jordan, both in the old town cemetery, and a second Campbell Stokes, rather more than a mile distant, in a new cemetery, near Boscombe. Each recorder is in the care of the Superintendent of the cemetery, who changes the cards and papers, and transmits them weekly to the observer, Mr. Charles Dales. The instrument from which records had recently been supplied to the Office was the Campbell Stokes in the old cemetery, but owing to the unsatisfactory character of the burns or scorches upon some of the cards it was found necessary to discontinue publishing the observations in the Weekly Weather Report. A careful examination of the records for the past three weeks in August showed that in several instances the cards from the recorder in question contained burns (extending sometimes over one or two hours) which were not only in themselves of a suspicious nature, but which were not shown either on the cards from the other Campbell Stokes instrument or on the records of the Jordan recorder, only a few feet away. Each of the Superintendents assured me most positively that the recorders were never touched, excepting at the times when the cards and papers were changed.

F. J. B.

Clacton-on-Sea, July 21st.—The sunshine instrument is a twin "Jordan" recorder, well exposed.

For report on other instruments, *see* page 61.

F. G.

Cockle Park, Morpeth, September 2nd.—The Sunshine recorder was clean and in good order, and firmly fixed. Its exposure continues to be excellent.

For report on other instruments, *see* page 65.

J. A. C.

Colwyn Bay, September 13th.—The returns from this station have been forwarded in a very irregular manner for some months past. The Town Clerk, whom I saw upon the subject, expressed his regret, and asked for a formal letter to be sent to him, so that the matter could be brought to the notice of the District Council.

R. H. C.

Durham, September 5th.—The sunshine recorder was in excellent order, and firmly fixed. Its exposure is very good.

For report on other instruments, *see* page 65.

J. A. C.

Jersey (*St. Heliers*), August 22nd.—The recorder here (at Fort Regent) is in a satisfactory state and appears to be properly attended to by the signalman in charge, Gunner Wright. The wooden post upon which the recorder is placed is, however, becoming rotten at the base. It is at present quite rigid, but it will probably be necessary to have a new one fixed up when the station is visited next year.

F. J. B.

Lowestoft, September 2nd.—For report, *see* page 66.

Newquay, August 14th.—The recorder here had been tampered with, presumably by boys. The pedestal upon which the ball rests was loose, and the ball itself was badly scratched, and in some places dented. I screwed the pedestal firmly up, and afterwards tested the position of the lens as regarded concentricity, &c. The ball should, I think, be replaced by a new one. To prevent further mischief, I strongly urged that the brick pillar upon which the recorder stands should be enclosed within a railing of sufficient strength and height to keep out all intruders.

F. J. B.

Rauceby, September 16th.—A sunshine recorder had been obtained by Rev. V. F. Willson, M.A., to be set up at Rauceby Hall, and I was asked to select a position for it.

There was no site with an uninterrupted exposure, and I eventually decided that the top of the wall of the kitchen garden, on its south-east side, was the best available, and I accordingly placed the instrument there and carefully adjusted it in its position. I then securely bedded the slate slab on to the coping stone of the wall with neat Portland cement.

Some sunshine will be cut off by trees in the early summer mornings and in the evenings.

For report on other instruments, *see* page 70.

J. A. C.

Scarborough, September 6th.—The instrument was out of proper adjustment, and I therefore dismounted it, and after carefully re-adjusting it both for meridian, latitude, and level, I firmly

cemented it in its place with Portland cement. I had some difficulty with the levelling, for the front part of the bowl gave a different result from the back part, but I left it with the best average I could obtain.

For report on other instruments, *see* pages 66 and 73.

J. A. C.

Sheffield (*Weston Park Museum*), September 12th.—The instrument was clean and in good order, and is carefully attended to.

For report on other instruments, *see* page 66.

J. A. C.

Sheffield (*Attercliffe*), September 12th.—The recorder was in general good order, but it was not fixed in position. I requested it should be bedded in with Portland cement, and this, it was promised, should be done at once.

There was no sunshine at the time of my visit, and I could not therefore test the adjustments for meridian or latitude. The cards shown to me were satisfactory.

J. A. C.

Sheffield (*High Hazel's Park*), September 12th.—Having been informed by Mr. Howarth that he had recently placed a new sunshine recorder on the roof of the High Hazel's Museum, I called to see the instrument.

The Museum building is an old mansion, standing on relatively high ground in the park, which is about 1¼ miles to the south of Attercliffe. The position is good. There is nothing near to obstruct the sun's rays, and the only loss of record will be when the sun is below the hills.

The instrument was not fixed in its place, but was simply resting on a small wooden platform which had been prepared for it. I adjusted it as accurately as the occasional gleams of sunshine would permit, and then secured it in its place by screwing fillets of wood on each side of it.

J. A. C.

Southampton, August 21st.—Owing to the erection of a flagstaff, which interfered with the exposure of the instrument, the sunshine recorder has been moved from its old position on the edge to a place on the sloping side of the roof. It has been firmly and carefully fixed, and the position is a good one, though somewhat difficult of access.

F. J. B.

For report on other instruments, *see* page 67.

York (*Bootham*), September 8th.—The sunshine recorder was clean and in good order.

J. A. C.

SCOTLAND.

Fort William, August 20th.—The sunshine recorder was safely removed to its new position, as indicated in last report, in October, 1901. A new stand was provided at the time.

A. B.

Stornoway, August 19th.—The sunshine recorder will be removed to the new position selected for it when the present crops—potatoes, &c.—are off the ground.

A. B.

IRELAND.

Dublin (*Phœnix Park*), August 16th and 23rd.—The adjustment of the sunshine recorder for level and latitude was slightly out, this was corrected. The recorder has been mounted on a wooden stand since the last inspection, but this has not proved altogether satisfactory, and I went again to this station on August 23rd, after Colonel Sims' return, and he agreed to have a metal bed made, with set screws at each angle, to replace the present wood stand. I fully explained the method of adjustment to Corporal Rose, and the new stand was made and recorder refixed early in September.

For reports on other instruments, *see* pages 68 and 77.

E. G. C.

Kingstown, August 23rd.—The sunshine recorder was slightly altered for latitude, the level and meridian being satisfactory. Trouble is experienced with the birds, which—especially in spring and summer—peck and drag at the cards. To prevent this the slips had been fastened in with a kind of "bird-lime," but this made it difficult to get the Noon line set properly, and I had the mixture removed, especially as the Sphere was coated with it.

For report on other instruments, *see* pages 70 and 77.

E. G. C.

D.—Barograph Stations.

Waterford, September 25th.—The indicator of the barograph at the Harbour Office was not working when I examined the instrument. Mr. Allingham, Secretary to the Port and Harbour Commission, had it put in order while I was there.

C. H.

Comparison of Instruments.

The following tables give the corrections required to be applied to the readings of the various instruments to make them agree with the Inspector's standards :—

Barometers.

Telegraphic Reporting Stations.

Station.	Inspector's Standard Corrected.	Reporting Barometer.	Check Barometer.	Remarks.
England and Wales.	Inches.	Inches.	Inches.	
Bath	—	—	—	Not visited.
Dungeness	30·108	+ ·001	+ ·010	The large error in the reporting bar. was confirmed by several readings.
Holyhead	30·320	+ ·018	+ ·004	
Jersey	30·240	− ·024	− ·020	
Liverpool (Bidston)	—	—	—	Not visited.
London	30·005	− ·014	—	
Loughborough	—	—	—	Not visited.
Oxford	29·622	+ ·003	—	
Pembroke (St. Ann's Head)	—	—	—	Not visited.
Portland Bill	—	—	—	
Scilly	30·054	·000	− ·006	
Shields	29·642	+ ·007	− ·002	
Spurn Head	—	—	—	
Yarmouth	29·821	− ·018	+ ·002	
Scotland.				
Aberdeen	30·000	·000	·000	
Leith	30·160	+ ·002	+ ·006	
Nairn	30·014	+ ·001	+ ·004	
Stornoway	—	—	—	
Sumburgh Head	—	—	—	Not visited.
Wick	29·950	+ ·008	·000	
Ireland.				
Blacksod Point	—	—	—	
Donaghadee	30·296	+ ·014	− ·001	
Malin Head	29·842	+ ·006	+ ·012	
Parsonstown	29·762	+ ·014	—	
Roches Point	—	—	—	
Valencia	29·819	+ ·009	+ ·006	

BAROMETERS.

NORMAL CLIMATOLOGICAL STATIONS (Second Order Station, International Classification).

STATION.	Inspector's Standard Corrected.	Reporting Barometer.	Check Barometer.	REMARKS.
ENGLAND AND WALES.	Inches.	Inches.	Inches.	
Belvoir Castle	—	—	—	
Birmingham (Edgbaston)	29·637	+ ·002	—	
Buxton	—	—	—	
Cambridge	29·774	+ ·008	—	
Cheadle	—	—	—	
Cockle Park, Morpeth ...	29·456	− ·005	—	
Darwen	29·529	+ ·003	—	A Fortin barometer.
Durham	29·755	+ ·006	—	
Fulbeck	—	—	—	
Garforth	29·339	+ ·009	—	
Hillington	—	—	—	
Hollesley Bay	29·090	− ·014	—	
Lowestoft	—	—	—	
Plymouth	29·996	− ·025	—	
Prestwich	—	—	—	Bar. broken and under repair.
Rounton	—	—	—	
Scarborough	—	—	—	
Seaham	29·676	− ·002	—	
Sheffield	—	—	—	
Southampton	30·142	− ·012	—	
Stonyhurst	29·448	+ ·007	—	
Wakefield	—	—	—	
Woburn	29·750	·000	—	
York	—	—	—	
SCOTLAND.				
Cally	—	—	—	
Cargen	—	—	—	
Deerness	—	—	—	
Dundee	29·773	+ ·003	—	
Dunrobin	30·095	+ ·001	—	
Fort William	—	—	—	
Gordon Castle	29·902	+ ·006	—	
Lairg	29·576	+ ·016	—	
Marchmont	—	—	—	
Ochtertyre	30·134	+ ·014	—	
Pinmore	—	—	—	
Poltalloch	—	—	—	
Rothesay	—	—	—	
Wolfelee	—	—	—	
IRELAND.				
Armagh	29·588	+ ·003	—	
Belfast	30·470	+ ·007	—	
Dublin, Glasnevin ...	30·112	+ ·007	—	
„ Phœnix Park ...	29·804	+ ·001	—	
Markree	—	—	—	
Newcastle, Co. Wicklow	29·702	·000	—	
Parsonstown	29·762	+ ·014	—	

BAROMETERS.

OTHER CLIMATOLOGICAL STATIONS.

STATION.	Inspector's Standard Corrected.	Reporting Barometer.	Check Barometer.	REMARKS.
ENGLAND AND WALES.	Inches.	Inches.	Inches.	
Barnstaple	29·779	+ ·005	—	
Bradford	29·451	+ ·011	—	A Fortin barometer.
Carlisle	—	—	—	Not compared.
Halifax, Bermerside ...	—	—	—	
„ Public Library..	29·209	− ·011	—	A Fortin barometer.
Hull	—	—	—	Not compared.
Huddersfield	—	—	—	A Fishery barometer, not compared.
Leeds	29·723	+ ·017	—	
Littlestone-on-Sea ...	30·114	+ ·004	—	
Lytham	30·003	− ·001	—	
Nottingham	—	—	—	Not compared.
Preston	—	—	—	Vernier out of order.
Rothamsted	29·629	+ ·010	—	
Salisbury	—	—	—	Not compared.
Truro	30·090	·000	—	
Wrottesley Park	29·960	+ ·052	—	A siphon barometer, very old instrument.
IRELAND.				
Kingstown	29·789	− ·001	—	

THERMOMETERS.

TELEGRAPHIC REPORTING STATIONS.

STATION.	Inspector's Standard Corrected.	Dry Bulb.	Wet Bulb.	Maximum.	Minimum.	Grass Minimum.	Spare.	REMARKS.
ENGLAND AND WALES.	°	°	°	°	°	°	°	
Bath	—	—	—	—	—	—	—	Not visited.
Clacton-on Sea	63·0	—	—	0·0	+ 0·1	—	+ 0·5	
Dungeness	62·1	− 0·2	− 0·3	0·0	0·0	—	—	
Holyhead	54·9	− 0·1	− 0·3	+ 0·1	+ 0·1	—	− 0·1	
Jersey	65·8	− 1·0	− 0·2	− 0·2	0·0	—	− 1·2	
Liverpool (Bidston) ...	—	—	—	—	—	—	—	Not visited.
London, Brixton... ...	59·3	− 0·2	0·0	0·0	+ 0·3	+ 0·2	—	
Loughborough	—	—	—	—	—	—	—	Not visited.
Newton Reigny	—	—	—	—	—	—	—	Not visited.
Oxford	62·0	− 0·4	− 0·3	− 0·4	+ 0·1	—	—	
Pembroke (St. Ann's Head).	61·8	− 0·2	+ 0·6	− 1·0	0·0	—	—	
Portland Bill	—	—	—	—	—	—	—	Not visited.
Scilly	60·0	− 0·8	− 0·5	− 1·0	− 0·3	—	− 0·2	Max. and min. not divided on stem.
Shields	59·3	− 0·3	− 0·5	− 0·6	+ 0·4	—	—	
Spurn Head	62·4	− 0·2	− 0·4	0·0	− 0·4	—	—	
Yarmouth	63·3	− 0·8	− 0·1	− 0·4	+ 0·7	—	− 0·6	
SCOTLAND.								
Aberdeen	56·0	0·0	− 0·1	− 0·2	0·0	—	—	
Leith	58·8	0·0	− 0·2	+ 0·1	+ 0·3	—	− 0·1	
Nairn	54·5	− 0·8	− 0·8	− 0·2	+ 0·2	—	—	
Stornoway	55·1	− 0·1	− 0·1	0·0	+ 0·2	—	− 0·1	
Sumburgh Head... ...	—	—	—	—	—	—	—	Not visited.
Wick	52·3	− 0·7	− 0·7	0·0	+ 0·1	—	—	
IRELAND.								
Blacksod Point	56·0	− 0·2	0·0	+ 0·1	+ 0·6	—	− 0·2	Sea Ther. 0·0.
Donaghadee	52·0	− 0·2	− 0·5	0·0	+ 0·5	—	0·0	
Malin Head	55·9	− 0·4	− 0·6	− 0·1	− 0·1	—	− 0·6	
Parsonstown	58·3	− 0·5	0·0	− 0·3	+ 0·1	—	—	
Roches Point	57·9	− 0·3	− 0·1	0·0	+ 0·4	—	—	
Valencia	60·0	− 0·5	− 0·5	− 0·4	0·0	—	+ 0·2	

THERMOMETERS.

NORMAL CLIMATOLOGICAL STATIONS (Second Order Station, International Classification).

STATION.	Inspector's Standard Corrected.	Dry Bulb.	Wet Bulb.	Maximum.	Minimum.	Grass Minimum.	Spare.	REMARKS.
ENGLAND AND WALES.	°	°	°	°	°	°	°	
Belvoir Castle	56·6	− 0·2	− 0·4	− 0·2	− 0·1	− 0·1	—	
Birmingham (Edgbaston)	57·5	− 0·7	− 0·6	− 0·1	+ 0·1	+ 2·1	—	
Buxton	60·1	− 0·3	− 0·3	− 0·2	− 0·2	—	—	
Cambridge	61·5	− 0·6	− 0·6	− 0·9	+ 0·7	—	—	
Cheadle	55·4	− 0·3	− 0·3	− 0·3	+ 0·1	0·0	—	
Cockle Park (Morpeth)...	60·2	− 0·1	0·0	− 0·5	+ 0·7	0·0	—	
Darwen	56·0	− 0·2	− 0·1	− 0·3	+ 0·5	+ 1·0	− 0·8	Spare ther. is used for water temperature.
Durham	56·6	− 0·6	− 0·6	0·0	− 0·1	+ 0·1	—	
Fulbeck	57·7	− 0·3	+ 0·2	+ 0·1	+ 0·2	+ 0·9	—	Max. returned to M.O. as the mercury slipped up the tube.
Garforth	65·0	0·0	− 0·1	− 0·1	0·0	0·0	—	
Hillington	58·9	0·0	− 0·4	− 0·6	0·0	0·0	—	
Hollesley Bay	65·0	0·0	0·0	0·0	+ 0·2	—	−0·7	
Lowestoft	63·5	− 0·5	− 0·5	− 0·3	+ 0·4	− 0·5	—	
Plymouth...	64·6	− 0·1	− 0·4	− 0·2	− 0·2	0·0	—	A little spirit at top of tube of grass min.
Prestwich...	61·8	− 0·4	− 0·3	− 0·1	− 0·2	+ 1·0	—	
Rounton	59·1	− 0·1	− 0·1	− 0·2	+ 0·1	+ 0·8	—	
Scarborough	56·8	0·0	0·0	− 0·1	+ 0·5	—	—	
Seaham	61·0	− 1·0	—	+ 0·2	− 0·1	—	−1·0	
Sheffield	56·0	− 0·2	− 0·5	− 0·2	0·0	+ 0·8	—	
Southampton	64·8	− 0·5	− 0·3	− 1·0	− 0·1	+ 0·3	—	
Stonyhurst	57·0	− 0·1	− 0·3	− 0·1	+ 0·4	+ 0·2	—	
Wakefield	56·8	− 0·4	− 0·6	− 0·5	+ 0·2	—	—	
Woburn	63·3	− 0·1	0·0	− 0·1	+ 0·1	—	—	
York	61·3	− 0·7	− 0·5	− 0·4	0·0	—	—	
SCOTLAND.								
Cally	58·2	− 0·1	+ 0·2	+ 0·1	+ 0·2	—	—	
Cargen	63·0	0·0	0·0	0·0	+ 0·2	—	—	
Deerness	53·2	− 0·1	− 0·1	+ 0·8	+ 0·3	—	—	
Dundee	56·8	+ 0·5	+ 0·5	− 1·4	+ 0·4	—	—	
Dunrobin	54·5	− 0·1	0·0	0·0	+ 0·1	—	—	
Fort William	59·0	− 0·2	− 0·2	− 0·1	+ 0·1	0.0	—	Min. broken during inspection.
Gordon Castle	54·0	− 0·2	0·0	0·0	+ 0·4	—	—	
Lairg	51·2	+ 0·2	+ 0·3	− 0·1	—	—	—	
Marchmont	56·6	− 0·1	0·0	0·0	+ 0·1	− 0·2	—	
Ochtertyre	55·4	0·0	+ 0·1	+ 0·1	0·0	+ 0·1	—	Max. and min. are instruments on loan.
Pinmore	59·8	− 0·1	− 0·1	+ 0·1	+ 0·1	—	—	
Poltalloch	60·0	0·0	0·0	0·0	+ 0·2	—	—	
Rothesay	60·0	− 0·1	− 0·1	+ 0·1	+ 0·3	—	—	
Wolfelee	55·0	0·0	+ 0·1	0·0	+ 1·0	—	—	
IRELAND.								
Armagh	59·0	− 0·4	− 0·5	0·0	0·0	+ 0·7	− 0·3	
Belfast	55·4	0·0	0·0	− 0·6	+ 0·4	—	—	
Birr Castle	58·3	− 0·5	0·0	+ 0·1	+ 0·2	—	—	
Dublin (Glasnevin) ...	58·0	− 0·4	− 0·5	0·0	+ 0·2	+ 1·8	—	
„ (Phœnix Park) ...	59·0	− 0·5	− 0·7	− 0·4	+ 0·4	+ 0·6	− 0·8	
Markree	—	—	—	—	—	—	—	
Newcastle (Co. Wicklow)	58·2	− 0·5	− 0·5	+ 1·1	+ 0·4	—	—	

THERMOMETERS.

OTHER CLIMATOLOGICAL STATIONS.

STATION.	Inspector's Standard Corrected.	Dry Bulb.	Wet Bulb.	Maximum.	Minimum.	Grass Minimum.	Spare.	REMARKS.
ENGLAND AND WALES.	°	°	°	°	°	°	°	
Ackworth...	55·4	− 0·3	− 0·3	—	0·0	—	—	
Alnwick Castle	56·7	− 0·3	− 0·3	− 0·3	+ 0·1	—	—	
Barnstaple	62·7	− 0·3	− 0·3	− 0·1	− 0·2	—	—	
Bawtry (Hesley Hall) ...	52·3	− 0·4	− 0·2	− 0·6	− 0·2	—	—	
Blackpool	61·1	0·0	—	+ 1·0	+ 0·4	—	—	Wet bulb broken.
Bristol, over Court ...	—	—	—	—	—	—	—	Not compared.
Bradford	58·2	−0·7	−0·5	+0·2	+0·5	—	—	
Carlisle	—	—	—	—	—	—	—	Not compared.
Felixstowe	63·3	+0·1	+0·1	0·0	+0·3	—	—	
Halifax, Bermerside ...	—	—	—	—	—	—	—	Not compared.
„ Public Library...	62·7	−0·2	−0·1	−0·1	0·0	—	—	
Hawarden Bridge ...	57·0	—	—	−0·1	0·0	—	—	
Hull	67·8	−0·4	−0·4	−0·1	+1·3	+2·8	—	A max. and min. used for dry and wet bulb.
Huddersfield	61·0	+0·3	0·0	−0·2	0·0	—	—	
Leeds	57·1	0·0	−0·1	+0·1	+0·3	—	—	
Littlestone-on-Sea ...	67·8	0·0	0·0	+0·1	+0·5	—	—	
Lytham	51·2	−0·2	0·0	0·0	−0·1	—	—	
Nottingham	—	—	—	—	—	—	—	Not compared.
Preston	61·0	− 0·7	−1·0	− 0·4	+ 0·3	—	—	
Rauceby	62·5	− 0·2	0·0	− 0·4	+ 0·4	—	—	
Rhyl	58·7	− 0·1	0·0	0·0	+ 0·3	+ 0·2	—	
Rothamsted	59·2	− 0·1	− 0·1	− 0·8	+ 0·1	—	—	Spare max. (645) — 1·0.
Salisbury...	61·5	−0·6	−0·5	0·0	+2·0	+0·5	—	Could not find any trace of spirit at end of tube of min. thermometer.
Truro	—	—	—	—	—	—	—	
Wrottesley Park... ...	—	—	—	—	—	—	—	Not compared.
SCOTLAND.—None.								
IRELAND.								
Kingstown	61·0	− 0·1	0·0	+ 0·2	+ 0·4	—	—	
Dundrum	60·0	—	—	+ 0·5	− 0·5	—	—	Six's ther.
Foynes	58·1	—	—	− 0·1	+ 0·7	—	—	
Kilkenny...	58·2	—	—	+ 0·1	+ 0·1	—	—	
Killarney...	59·1	—	—	− 1·5	+ 0·3	—	—	
Roxborough	52·5	+ 1·3	− 0·3	+ 1·3	+ 0·3	—	—	

THERMOMETERS.

OBSERVATORIES.

STATION.	Inspector's Standard Corrected.	Dry Bulb.	Wet Bulb.	Maximum.	Minimum.	Grass Minimum.	Spare.	REMARKS.
ENGLAND AND WALES.								
Oxford	62·0	−0·2	−0·2	—	—	+0·5	—	
Stonyhurst	57·0	−0·1	−0·3	−0·1	+0·4	+0·2	—	
SCOTLAND.								
Aberdeen...	50·0	−0·1	−0·7	0·0	+0·3	—	—	
Fort William	56·0	0·0	−0·1	0 0	0·0	—	—	
Do.	59·0	—	—	0·0	0·0	—	—	
Glasgow	55·0	−0·1	−0·1	−0·1	+0·2	0·0	—	
IRELAND.								
Valencia	60·0	−0·7	−0·5	−0·1	0·0	—	—	

424. *Office Staff.*—The Secretary reported that after examination he had appointed A. T. Bench, boy clerk, as probationer in the Forecast Branch in place of H. Prickett, resigned; and that he had appointed W. J. Tomkins, of the St. Andrew's Street School, Clapham, as boy clerk at a salary of 11*s.* per week, to date from 1st September, 1902.

Approved.

425. *Logs.*—Thirty-eight received, 13 excellent; also five lighthouse registers and nine short logs.

426. *Forecasts.*—Report on the Forecasts issued at 8.30 p.m. daily during July, 1902 :—

The letters used have the following signification :—
a = complete success. | c = partial failure.
b = partial (*i.e.*, more than half) success. | d = total failure.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success. a + b.
Scotland, N.	a	49	71	60	81
"	b	22	20	21	
"	c	20	6	13	
"	d	9	3	6	
Scotland, E.	a	39	42	41	81
"	b	39	42	40	
"	c	16	13	15	
"	d	6	3	4	
England, N.E.	a	42	65	54	81
"	b	29	26	27	
"	c	29	9	19	
"	d	0	0	0	
England, E.	a	49	51	50	79
"	b	22	36	29	
"	c	29	13	21	
"	d	0	0	0	
Midland Counties	a	39	39	39	88
"	b	45	52	49	
"	c	13	9	11	
"	d	3	0	1	
England, S.	a	55	45	50	90
"	b	32	48	40	
"	c	10	7	9	
"	d	3	0	1	
Scotland, W.	a	52	55	54	83
"	b	26	32	29	
"	c	9	13	11	
"	d	13	0	6	
England, N.W.	a	48	52	50	94
"	b	45	42	44	
"	c	7	3	5	
"	d	0	3	1	
England, S.W.	a	52	49	51	88
"	b	32	42	37	
"	c	16	9	12	
"	d	0	0	0	
Ireland, N.	a	42	58	50	84
"	b	39	29	34	
"	c	16	13	15	
"	d	3	0	1	
Ireland, S.	a	39	49	44	78
"	b	32	35	34	
"	c	23	16	19	
"	d	6	0	3	
Summary.					
British Islands	a	46	52	49	84
"	b	33	37	35	
"	c	17	10	14	
"	d	4	1	2	

Report on the Forecasts issued at 8.30 p.m. daily during August, 1902 :—

The letters used have the following signification :—
a = complete success. | c = partial failure.
b = partial (*i.e.*, more than half) success. | d = total failure.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success. a + b.
Scotland, N.	a	32	32	32	74
"	b	35	49	42	
"	c	26	16	21	
"	d	7	3	5	
Scotland, E.	a	42	49	46	88
"	b	39	45	42	
"	c	16	6	11	
"	d	3	0	1	
England, N.E.	a	42	42	42	86
"	b	39	49	44	
"	c	19	9	14	
"	d	0	0	0	
England, E.	a	32	61	47	88
"	b	42	39	41	
"	c	19	0	9	
"	d	7	0	3	
Midland Counties	a	78	58	68	96
"	b	16	39	28	
"	c	6	3	4	
"	d	0	0	0	
England, S.	a	74	58	66	84
"	b	13	23	18	
"	c	10	16	13	
"	d	3	3	3	
Scotland, W.	a	36	26	31	86
"	b	45	65	55	
"	c	19	6	13	
"	d	0	3	1	
England, N.W.	a	48	49	49	91
"	b	42	42	42	
"	c	7	9	8	
"	d	3	0	1	
England, S.W.	a	39	65	52	85
"	b	39	26	33	
"	c	19	9	14	
"	d	3	0	1	
Ireland, N.	a	39	55	47	89
"	b	39	45	42	
"	c	22	0	11	
"	d	0	0	0	
Ireland, S.	a	42	61	52	82
"	b	29	32	30	
"	c	23	7	15	
"	d	6	0	3	
Summary.					
British Islands	a	46	50	48	86
"	b	34	41	38	
"	c	16	8	12	
"	d	4	1	2	

M.O. 1,627.

Newton Reigny, Penrith,
2nd September, 1902.

DEAR SIR,

ON the 29th April last I sent you the result of the checking of the 100 Forecasts issued at 11 a.m. between 1st January and 27th April.

The work of checking the Forecasts has been carefully continued, and I now send you the result for the 200 from 1st January to 22nd August.

Yours faithfully,
T. G. BENN.

W. N. Shaw, Esq.,
Meteorological Office.

	Wind.	Weather.	Average.
Complete success	144	134	140
Partial success	50	63	56
Failure	6	3	4
	200	200	200

427. *Storm Warnings.*—Submitted—The following as the result of the Primary Checking of the Storm Warnings issued to the Coasts of the British Islands since the last meeting of the Council :—

WARNINGS ISSUED.

Signals hoisted on 10 days, total number of districts warned, 46.

In six districts the warnings were justified by subsequent gales (force 8 and upwards) and in 16 districts by subsequent strong winds (force 6 and 7). In 25 districts they were not required.

GALES EXPERIENCED FOR WHICH NO WARNINGS WERE ISSUED.

September 3rd, Morning.—A brief but sharp gale from S. and S.W. was felt in Devon, Cornwall, and Wales. It was afterwards felt in Scotland but that country was duly warned.

FREDC. GASTER.

428. *Reports of Work:—*

MARINE BRANCH.

July.

Examined 9 new logs.

District south of the Equator, between the west coast of Africa and 90° W. longitude. Preparing Ocean Charts for engraving and publication.

Indian Ocean District—from latitude 30° N. to 30° S. Preparing and extracting data in Office logs.

Monthly Pilot Chart of the North Atlantic and Mediterranean. August Chart and September letterpress passed for press. October Chart and remarks prepared. Charting Sea Temperatures for May, June, and July, and the means for May prepared and published on the August Chart. Obtaining wind and fog results to north of 50° N. latitude for August and September. Registering and acknowledging reports of ice and sea temperature and issuing Charts and fresh supplies of Forms.

Annual Report—Preparing details of work relating to Branch.

African Meteorological Reports—Assistance given for examining observations, and abstracts made.

Mr. Carter has given assistance throughout month to Forecasting Branch.

August.

Examined 12 new meteorological logs, 5 short meteorological logs, and 3 lighthouse registers.

Discussion south of the Equator, between the west coast of Africa and 90° W. longitude. Preparing Ocean Charts for engraving and publication.

Indian Ocean District—from latitude 30° N. to 30° S. Preparing and extracting data in Office logs.

Monthly Pilot Chart of the North Atlantic and Mediterranean. September Chart passed for press. October Chart sent to lithographer. November and December Charts well advanced. Charting sea temperatures for June, July, and August. Obtaining wind and fog results to north of 50° N. latitude for November; also wind results for December, January, February, and March. Registering and acknowledging reports of ice and sea temperatures and issuing Charts and fresh supplies of Forms.

Sailing Directions for North Sea and China Sea. Obtaining results of meteorological observations at several places for publication in new issues.

Mr. Carter has given assistance in forecast Branch throughout the month.

September.

Examined 17 new meteorological logs, 3 short meteorological logs, and 2 lighthouse registers.

Discussion south of the Equator, between the west coast of Africa and 90° W. longitude. Preparing Ocean Charts for engraving and publication.

Indian Ocean District—from latitude 30° N. to 30° S. Preparing and extracting data in Office logs.

Monthly Pilot Chart of the North Atlantic and Mediterranean. October Chart passed for press. November Chart sent to lithographer. Charting sea temperatures for July and August. Obtaining wind results north of 50° N. for March. Registering and acknowledging reports of ice and sea temperatures and issuing Charts and fresh supplies of Forms.

Sailing Directions for North Sea and China Sea. Obtaining results of meteorological observations at several places for publication in new issues.

CAMPBELL HEPWORTH.

Observatory Branch.

July.

Hourly Means, 1899.—Volume for 1899—Proof has been passed for press up to page 80. Volume for 1900—The tables required for this volume have only been slightly advanced during the month.

Wind Tables for the British Islands.—The form for this work has been provisionally settled and specimen pages prepared for the printer.

Examination of Documents, &c.—The tabulations, &c., received from the five observatories since the middle of 1900 are being examined and checked; the sheets for 1901 are now in hand.

Miscellaneous.—Tabular matter required for the Annual Report has been prepared.

Bournemouth sunshine cards have been specially examined with reference to the management of the instrument.

Holyhead anemograms have been tabulated for Dublin.

Bunhill Row sunshine cards, January to June, have been tabulated for the Royal Meteorological Society.

Copies of Ben Nevis observations made for Prof. Hergesell.

Corrections have been inserted in the copies of Temperature Tables now in the Office.

The self-recording rain gauge on the roof has been attended to, and the clock regulated.

I was absent from Office for 11 days erecting a pressure tube anemometer at Falmouth, and inspecting the anemometers at Scilly.

The Telegraphic Branch has made 40 remeasurements of barograms and thermograms for four observatories for the month of May, and has extracted the differences between the standard and tabulated readings for the months of April and May.

R. H. Curtis.

August.

Hourly Means.—Volume for 1899—Proof has been passed for press up to page 120, and "copy' for Valencia hourly readings has been sent to the printer.

Supplement to Temperature Tables.—An additional table of annual temperatures for each district has been prepared. Proof received and passed for press up to page 16.

Examination Work.—The curves and tabulations up to May, 1901, for the five observatories have been examined.

Miscellaneous.—Holyhead anemograms tabulated for Dublin.

The self-recording rain gauge on the roof has been attended to.

Inspection notes for the observatories and sunshine stations were prepared.

Wind tables for Yarmouth, Gorleston, and Hollesley Bay were specially calculated for the War Office.

During August the Forecasting Branch has completed the 40 remeasurements of barograms and thermograms for four observatories for the month of June, and two observatories for the month of July, and for the latter month the remeasurements for two other observatories are about half completed.

Mr. Curtis is away from the Office on his annual inspections.

C. H. Thompson.

September.

Hourly Means.—Volume for 1899—Proof has been received up to page 176, and passed for press up to page 168. All the copy has now been sent to the printer.

Volume for 1900—The copying of the hourly values is being proceeded with.

Supplement to Temperature Tables.—The preface and table of contents have yet to be passed for press, the remainder of the work has been read and signed for press.

Examination Work.—The curves and tabulations have been examined for about three-fourths of the year 1901.

Miscellaneous.—The Holyhead anemograms have been tabulated weekly, and copies of the tabulations sent to Dublin.

A specimen page of the proposed wind tables has been prepared.

Copies of Ben Nevis observations have been made for Prof. Hergesell.

During the month the Forecast Branch has made remeasurements and comparison of standard with tabulated readings to the end of August for all observatories.

Anemograms from Deerness for one and a half months have been tabulated.

R. H. Curtis.

Statistical and Library Branch.

July, 1902.

1. Issue of Publications :—

Daily and weekly publications regularly issued.

Monthly Summary of the Weekly Weather Report for May, 1902, received and issued.

Pilot Charts for August, 1902, received, and 264 copies issued; also 228 copies of charts for previous months issued to Captains of ships and others.

Presentation copies of publications, 65 in all, issued to Captains and Officers of ships and others.

2. Statistical and Station Work :—

Tables for the weekly issues of the "Weekly Weather Report" prepared to date, and carried through the press.

Tables and Maps Nos. 1, 3, and 4 for the Monthly Summary of the "Weekly Weather Report" for June prepared and sent to the printer.

Quarterly Summary of the "Weekly Weather Report" for the second quarter of 1902 prepared and sent to the printer.

Results of daily observations of Temperature and Rainfall prepared and regularly supplied to the Registrars General for their Weekly Returns, namely, for—

England and Wales from	15 Stations.
Ireland	6 Stations.

Monthly and quarterly results of complete observations at 28 Stations prepared and supplied to the Registrar General for England and Wales for publication in his Quarterly Return.

Ten-day Means for certain Stations prepared and supplied to Dr. Neumayer, Hamburg, to date.

"Returns from Stations of the Second Order" for 1899 proceeded with.

Cyprus Observations. Preparation of the results for 6 Stations for 1901, on Form B., proceeded with.

List of Stations and Observers for Annual Report for 1901–2. Proof read and corrected.

A good deal of time was occupied on work connected with—

1. Preparation of the Annual Report for 1901–2.
2. Preparation of results of the Meteorological observations taken at Cape Adare by the "Southern Cross" Expedition, and
3. Proposed publication by the Office of results for Foreign and Colonial Stations.

3. Library :—

Accessions to Library received and catalogued on cards.

Thirty-two volumes of publications prepared for and forwarded to the binders.

Eighty-nine volumes of publications received from binders, examined, press-marked, and stored.

List of accessions to Library for Annual Report, 1901-2 (Appendix X.), read in "proof" and corrected.

4. Inquiries :—

Sixty-one inquiries were dealt with during July. Twelve of these were by letter, but in 49 cases personal application was made. In 11 cases of personal application payment was made for the time occupied in the preparation of the information required.

Miss Cave, in collaboration with Prof. Karl Pearson, F.R.S., and Mr. Hodgson on behalf of Sir Norman Lockyer, F.R.S., were engaged during part of the month in extracting data relating to pressure and rainfall at various Foreign and Colonial Stations from books and manuscripts in the possession of the Council.

5. General :—

Part of the staff absent on vacation during portions of July, and Mr. Rigby away on sick leave for three weeks.

August, 1902.

1. Issue of Publications :—

Daily and weekly publications regularly issued.

Monthly Summary of the "Weekly Weather Report" for June, 1902, received and issued.

Pilot Charts for September, 1902, received, and 287 copies issued; also 325 copies of charts for previous months issued to Captains of ships and others.

Presentation copies of publications, 53 in all, issued to Captains and Officers of ships and others.

Accessions to Library during 1900–1 (Appendix XI.) issued to donors of publications.

2. Statistical and Station Work :—

Tables and maps for the weekly issues of the "Weekly and Monthly Reports" as in July.

Weekly Returns for the Registrars General as in July.

Quarterly Summary of the "Weekly Weather Report" for the second quarter of 1902 revised and passed for press.

Ten-day Means of observations at certain Stations prepared and regularly supplied to Dr. Neumayer, Hamburg.

"Returns from Stations of the Second Order" for 1899 proceeded with.

Cyprus Observations. Preparation of the results for six Stations on International Form B. completed and sent to Cyprus for publication in Cyprus Blue Book.

Inspection Notes prepared for Stations of the Second Order and Third Order.

3. Library :—

Accessions to Library received and catalogued on cards.

Thirty-two volumes of publications received from the binders, examined, press-marked, and stored.

4. Inquiries :—

Forty-five inquiries were dealt with during August. Four of these were by letter, but in 41 cases personal application was made. In six cases of personal application payment was made for the time occupied in preparing the information asked for.

5. General :—
Several members of the staff of the Department were absent during parts of August on annual leave.
Assistance rendered in Forecast Branch during vacations by Mr. Bracey on 19 days and Mr. Heinemann on two days.

September, 1902.

1. Issue of Publications :—
Daily and weekly publications regularly issued.
Monthly Summary of the "Weekly Weather Report" for July, 1902, received and issued.
Quarterly Summary of the "Weekly Weather Report" for the second quarter of 1902 received and issued.
Pilot Charts for October, 1902, received, and 301 copies issued ; also 320 copies of charts for previous months issued to Captains of ships and others.
Presentation copies of publications, 43 in all, issued to Captains and Officers of ships and others.

2. Statistical and Station Work :—
Tables for the weekly issues of the "Weekly Weather Report" prepared to date, and carried through the press.
Tables and Maps Nos. 1, 3, and 4 for the Monthly Summary of the "Weekly Weather Report" for August, 1902, proceeded with.
Weekly Returns for the Registrars General as before.
Ten-day Means of observations at five British Stations prepared and regularly supplied to Dr. Neumayer, Hamburg.
"Returns from Stations of the Second Order" for 1899 proceeded with.

3. Library :—
Accessions to Library received and catalogued on cards for reporting in "Minutes."
Some time occupied in the annual cleaning, &c., of portions of the Library.

4. Inquiries :—
Forty-seven inquiries were dealt with during September. Four of these were by letter, but in 43 cases personal application was made. In six cases of personal application payment was made for the time occupied in the preparation of the information supplied.
Miss Cave was engaged for several days extracting data respecting pressure at certain Foreign and Colonial Stations.

5. General :—
Mr. Rigby was absent for 22 days on summer vacation, and Mr. Bracey for six days. I was away from Office for 15 days engaged on inspection duty.

JOHN A. CURTIS.

MONTHLY RETURN OF "A" AND "M.O." INSTRUMENTS ON CHARGE.

July, 1902.

—	Barometers.	Aneroids.	Thermometers. Ordinary.	Thermometers. Maximum.	Thermometers. Minimum.	Thermometers. Solar Radiation.	Thermometers. Terr. Radiation.	Screens.	Hydrometers.	Rain Gauges.	Anemometers.	Storm Cones.	Sunshine Recorders.	Glass Spheres.	Miscellaneous.
"A" ACCOUNT.															
Dr.															
On charge, 1st July, 1902	50	121	99	114	117	—	—	71	41	2	—	—	—	—	
Received since	18	29	147	6	10	—	—	—	—	—	—	—	—	—	
	68	150	246	120	127	—	—	71	41	2	—	—	—	—	
Cr.															
Sent out during month...	43	56	55	7	12	—	—	11	4	—	—	—	—	—	
On charge, 1st Aug., 1902	25	94	191	113	115	—	—	60	37	2	—	—	—	—	
"M.O." ACCOUNT.															
Dr.															
On charge, 1st July, 1902	7	2	44	12	—	3	5	5	58	8	1	8	3	3	1 Barograph. 1 Hygrograph.
Received since	22	5	20	—	—	—	1	—	—	—	—	—	1	2	
	29	7	64	12	—	3	6	5	58	8	1	8	4	5	
Cr.															
Sent out during month...	12	5	8	—	—	—	2	—	—	—	—	—	2	2	1 Robinson's Anemometer. 1 Electroscope. 1 Dines' Anemometer.
On charge, 1st Aug., 1902	17	2	56	12	—	3	4	5	58	8	1	8	2	3	1 Barograph. 1 Hygrograph.

10th August, 1902.

R. F. WALLACE.

MONTHLY RETURN OF "A" AND "M.O." INSTRUMENTS ON CHARGE.

August, 1902.

—	Barometers.	Aneroids.	Thermometers. Ordinary.	Maximum.	Minimum.	Solar Radiation.	Terr. Radiation.	Screens.	Hydrometers.	Rain Gauges.	Anemometers.	Storm Cones.	Sunshine Recorders.	Glass Spheres.	Miscellaneous.
"A" ACCOUNT.															
Dr.															
On charge, 1st Aug., 1902	25	94	191	113	115	—	—	60	37	2	—	—	—	—	
Received since	29	43	63	4	—	—	—	—	—	—	—	—	—	—	
	54	137	254	117	115	—	—	60	37	2	—	—	—	—	
Cr.															
Sent out during month...	5	—	1	4	—	—	—	10	—	—	—	—	—	—	
On charge, 1st Sept., 1902	49	137	253	113	115	—	—	50	37	2	—	—	—	—	
"M.O." ACCOUNT.															
Dr.															
On charge, 1st Aug., 1902	17	2	56	12	—	3	4	5	58	8	1	8	2	3	1 Barograph. 1 Hygrograph.
Received since	7	—	8	—	6	—	6	34	4	—	—	—	2	—	1 Thermograph.
	24	2	64	12	6	3	10	39	62	8	1	8	4	3	
Cr.															
Sent out during month...	10	—	42	—	—	—	—	31	7	—	—	—	1	—	
On charge, 1st Sept., 1902	14	2	22	12	6	3	10	8	55	8	1	8	3	3	1 Barograph. 1 Hygrograph. 1 Thermograph.

5th September, 1902. R. F. WALLACE.

MONTHLY RETURN OF "A" AND "M.O." INSTRUMENTS ON CHARGE.

September, 1902.

—	Barometers.	Aneroids.	Thermometers. Ordinary.	Maximum.	Minimum.	Solar Radiation.	Terr. Radiation.	Screens.	Hydrometers.	Rain Gauges.	Anemometers.	Storm Cones.	Sunshine Recorders.	Glass Spheres.	Miscellaneous.
"A" ACCOUNT.															
Dr.															
On charge, 1st Sept., 1902	49	137	253	113	115	—	—	50	37	2	—	—	—	—	
Received since	30	14	11	3	3	—	—	—	—	—	—	—	—	—	
	79	151	264	116	118	—	—	50	37	2	—	—	—	—	
Cr.															
Sent out during month...	3	—	6	3	1	—	—	6	—	—	—	—	—	—	
On charge, 1st Oct., 1902	76	151	258	113	117	—	—	44	37	2	—	—	—	—	
"M.O." ACCOUNT.															
Dr.															
On charge, 1st Sept., 1902	14	2	22	12	6	3	10	8	55	8	1	8	3	3	1 Barograph. 1 Hygrograph.
Received since	24	—	56	5	3	2	4	1	8	—	—	—	—	—	1 Thermograph.
	38	2	78	17	9	5	14	9	63	8	1	8	3	3	
Cr.															
Sent out during month...	12	—	67	7	3	3	5	2	10	—	—	—	1	1	
On charge, 1st Oct., 1902	26	2	11	10	6	2	9	7	53	8	1	8	2	2	1 Barograph. 1 Hygrograph. 1 Thermograph.

3rd October, 1902. R. F. WALLACE.

429. *Accounts: Audit.*—The Secretary reported that the Accounts for the year ended 31st March, 1902, had been audited by the Examiner from the Exchequer and Audit Department on 24th September, 1902.

429. — Submitted — The following Statement of Accounts for the quarter ending 30th June, 1902 :—

Receipts.	£ s. d.	£ s. d.	Payments.	£ s. d.	£ s. d.
Balance from year 1901–1902	—	2,464 19 7	Administration :		
Proportion of vote ...	—	3,500 0 0	Secretary	150 0 0	
Repayment of expenses charged under—			Salaries and wages ...	267 1 9	
(1.) Incidental expenses	20 13 10		Rent, fuel, and lighting	186 12 11	
(2.) Observatories ...	8 18 7		Incidental and contingent expenses ...	81 19 10	
		29 12 5	Furniture and fittings	291 7 8	
					977 2 2
Supply of Information :			Special Researches :		
Weather Forecasts, Reports, &e. ...	250 8 7		Salaries and other charges	—	172 0 6
Telegrams sent abroad	365 4 4		Land Meteorology :		
		615 12 11	Observatories and stations, including remuneration of observers	572 14 8	
Supply of Instruments, &c. :			Salaries :— Discussion and reduction of observations, &c. ...	469 2 6	
					1,041 17 2
Repayment of cost of M. O. instruments purchased by observers	43 2 0		Weather Information and Forecasts :		
Repayment of cost of other commissions...	14 2 0		Telegraphic reports and storm warnings, remuneration of observers, &c.	863 0 5	
		57 4 0	Salaries:—Preparation and issue of reports and forecasts ...	374 2 3	
					1,237 2 8
Charges for Commission :					
On supply of instruments, &c.	—	2 9 0	Ocean Meteorology :		
			Salaries :— Discussion and reduction of observations... ...	351 4 10	
Superannuation Account :			Expenses incidental to the supply of instruments :—		
Annuity	35 6 3		Proportion for care and issue of instruments	33 15 0	
Interest on Investment	9 5 8		Royal Navy ...	161 10 11	
		44 11 11	Mercantile Marine...	49 0 3	
					595 11 0
			Miscellaneous commissions executed for Colonial and Foreign institutions, &c. ...	—	79 7 6
			Superannuation :		
			Pensions and allowances...	171 6 3	
			Invested	750 0 0	921 6 3
			Balance :		
			Cash at Bank... ...	1,643 19 2	
			„ at Office ...	46 3 5	
					1,690 2 7
		£6,714 9 10			£6,714 9 10

Liabilities.	£ s. d.	Assets.	£ s. d.
To sundry creditors	865 14 2	By cash at Bank and at Office ...	1,690 2 7
„ balance	1,624 19 8	„ H.M. Exchequer	325 0 0
		„ sundry debtors	475 11 3
	£2,490 13 10		£2,490 13 10

Note.—On June 30th the amount of 2½ per cent. Consols held by the Council for the provision of superannuation annuities was £2,368 6s. 5d.

429. Submitted—the following statement of accounts :—

	£	s.	d.
Cash balance on 3rd July	1,655	11	0
Receipts from 4th July to 7th October	7,274	4	10
	8,929	15	10
Cheques drawn from 4th July to 7th October ...	3,857	4	2
Cash balance on 7th October	£5,072	11	8

430. Submitted—the following list of publications which had been received since the last meeting :—

[*Allahabad, Meteorological Office.*]—Administration report of the Meteorological Reporter to Government, United Provinces of Agra and Oudh, for the year 1901–1902.

—— —— Annual statement of rainfall in the North-Western Provinces and Oudh for the year 1901.

—— —— Brief sketch of the meteorology of the United Provinces of Agra and Oudh, and adjacent parts of Rajputana and the Punjab, for the year 1901.

Bangalore, Mysore Government Meteorological Department.—Meteorology in Mysore for 1901, being the results of observations at Bangalore, Mysore, Hassan, and Chitaldrug. 9th annual report by John Cook.

Bell, Arthur H.—The biography of a snowflake.

—— Building a thunderstorm.

Berlin, Königlich Preussisches Meteorologisches Institut.—Ergebnisse der Arbeiten am Aëronautischen Observatorium in den Jahren 1900 und 1901. Von R. Assmann und Arthur Berson.

Berne, Eidgenössisches Oberbauinspectorat, Hydrometrisches Abteilung.—Graphische Darstellung der schweizerischen hydrometrischen Beobachtungen und der Lufttemperaturen und Niederschlagshöhen für das Jahr 1900.

Bordeaux, Commission Météorologique de la Gironde.—Observations pluviométriques et thermométriques faites dans le Département de la Gironde. Note de M. G. Rayet. Juin 1882–Mai 1901. 19 vols.

Börnstein, R.—Die Verlegung des wettertelegraphischen Dienstes auf eine frühere Stunde.

Bremen, Meteorologische Station I. Ordnung.—Deutsches meteorologisches Jahrbuch für 1901. Freie Hansestadt Bremen. Herausgegben von P. Bergholz. Jahrg. 12.

Brodie, F. J.—The prevalence of gales on the coasts of the British Islands during the 30 years 1871–1900.

Buchan, A., and Omond, R. T.—The meteorology of the Ben Nevis Observatories. Part 2. Containing the observations for the years 1888–1892, with appendices.

Calcutta, Meteorological Office, Bengal.—Administration report of the Meteorological Reporter to the Government of Bengal for the year 1901–1902.

—— —— —— Summary of the meteorology of Bengal for the year 1901.

—— —— *India.*—Memorandum on the meteorological conditions prevailing in the Indian monsoon region before the advance of the south-west monsoon of 1902, with an estimate of the probable distribution of the monsoon rainfall in 1902.

—— —— —— Memorandum on the meteorological conditions prevailing in the Indian monsoon region during the first half of the south-west monsoon of 1902, with an estimate of the probable distribution of the monsoon rainfall during August and September, 1902. By J. Murray.

Cambridge (Mass.), Astronomical Observatory of Harvard College.—Annals. Vol. 43. Part 2. Observations made at the Blue Hill Meteorological Observatory, Mass., U.S.A., in the years 1899 and 1900. Under the direction of A. L. Rotch.

Carlsruhe, Centralbureau für Meteorologie und Hydrographie.—Deutsches meteorologisches Jahrbuch für 1901. Baden.

—— —— Jahresbericht . . . mit den Ergebnissen der meteorologischen Beobachtungen und der Wasserstandsaufzeichnungen am Rhein und an seinen grössern Nebenflüssen für das Jahr 1901.

Colonial Office List for 1902 : comprising historical and statistical information respecting the colonial dependencies of Great Britain.

Cracow, C. K. Akademii Umiejetnosci w Krakowie.—Materyaly do klimatografii Galicyi zebrane przez sekcye meteorologiczna komisyi fizyograficznej . . . 1901.

Croydon Microscopical and Natural History Club.—Report of the Meteorological Sub-Committee for 1901.

Dorpat, kaiserliche livländische gemeinnützige und ökonomische Sozietät.—Bericht über die Ergebnisse der Beobachtungen an den Regenstationen. 1900.

Emden, Naturforschende Gesellschaft.—Jahresbericht. 86. 1900–1901.

Falmouth Observatory.—Meteorological and magnetical tables and reports for the year 1901 . . . . by W. L. Fox and E. Kitto.

Fergusson, S. P.—Progress in meteorological kite flying.

Frankfurt am Main, Physikalischer Verein.—Jahresbericht . . . für das Rechnungsjahr 1900–1901.

Hamburg, Deutsche Seewarte.—Aus dem Archiv der Deutschen Seewarte. 24 Jahrg., 1901.

—— —— Handbuch der Afrikanischen Westküste zwischen Kap Verde und Lagos.

—— —— Handbuch der Ostküste Südamerikas zwischen dem Kap San Roque und der Magellan-Strasse.

Hann, J.—Zur Meteorologie des Äquators. Nach den Beobachtungen am Museum Goeldi in Pará.

Havana, Observatorio del Colegio de Belen de la Compañia de Jesus. Observaciones meteorológicas. 1901.

Hellmann, G.—Neudrucke von Schriften und Karten über Meteorologie und Erdmagnetismus. Herausgegeben von G. Hellmann. No. 14. Meteorologische Optik, 1000–1836.

Hong Kong Observatory.—Observations. 1901.

Knipping, E.—Die Entwickelung der Anweisungen zum Manövriren in Wirbelstürmen.

Leeds Philosophical and Literary Society.—A decade of sunshine observations at Leeds [1887–1896], by Henry Crowther and R. Reynolds.

Loanda, Observatorio Meteorologico.—Observações meteorologicas. Vol. 8, 1894–1895.

London, Admiralty, Hydrographic Department.—The Irish Coast Pilot. 5th ed.

—— —— —— List of oceanic depths and serial temperature observations received at the Admiralty during the year 1901, from H.M. Surveying Ships, Indian Marine Survey, and British Submarine Telegraph Companies.

—— —— —— Report on observations of the tidal currents and undercurrents in the Strait of Dover, made with a deep sea current meter. By Maurice F. J. Wilson and Captain A. Mostyn Field, R.N., H.M.S. "Research."

—— —— —— Tide tables for the British and Irish Ports for the year 1903; also the times and heights of high water at full and change for the principal places on the Globe.

London, General Register Office.—Annual summary of births, deaths, and causes of death in London and other large towns. 1900, 1901.

Manila, Department of the Interior, Philippine Weather Bureau.—Report of the Director of the Philippine Weather Bureau, 1901–1902. Part 1. The climate of Baguio (Benguet), by Rev. Fr. José Algué.

Margate.—Annual report on the meteorology of Margate, by the Borough Meteorologist. 1902.

Mauren, H.—Ableitung der normalen Morgen- und Nachmittagstemperaturen der deutschen Stationen für die Wetterberichte der Deutschen Seewarte.

Mauritius, Meteorological Society.—Proceedings and transactions. 1901. Vol. 2, new series.

Melbourne Observatory.—Report of the Board of Visitors to the Observatory, together with the report of the Government Astronomer. 36th, 1901–1902.

Mexico, Observatorio Meteorológico Central.—Informe que el Director del Observatorio Meteorológico Central, Ing. Manuel E. Pastrana, rinde al Secretario de Fomento sobre las observaciones ejecutadas durante el eclipse total de Sol de 28 de Mayo de 1900. Text and atlas. 2 vols.

Milan, R. Osservatorio Astronomico di Brera in Milano.—Osservazioni meteorologiche eseguite nell' anno 1901, col riassunto composto sulle medesime da E. Pini.

Mossman, R. C.—The meteorology of Edinburgh. Part 3.

Nottingham, Rural District Council of Basford.—Annual report. 1901. By G. B. Wray, Medical Officer of Health.

Odessa, Observatoire [Magnétique et] Météorologique de l'Université Impériale.—Annales. 1900, 7me année.

—— *Observatoire Magnétique et Météorologique de l'Université.*—Revue météorologique. Travaux du réseau météorologique du sud-ouest de la Russie. Pav A. Klossovsky. 2e série, vol. 5, 1900.

Ottawa, Department of Marine and Fisheries.—Report of the Meteorological Service of Canada, by R. F. Stupart. 1899.

Paris, Service Hydrométrique du Bassin de la Seine.—Observations sur les cours déau et la pluie centralisées pendant l'année 1900 . . . 7 plates.

—— —— Résumé des observations centralisées . . . pendant l'année 1900 . . .

Perpignan, Commission Météorologique Départementale des Pyrenées-Orientales.—Bulletin météorologique annuel . . . par le Dr. Fines. 1898-1900. 27e–29e. 2 vols.

Perth Observatory.—Meteorological observations made at the Perth Observatory and other places in Western Australia during the year 1900.

Pola, Hydrographisches Amt der K. K. Kriegs-Marine.—Veröffentlichungen. Gruppe ii. Jahrbuch der meteorologischen, erdmagnetischen und seismischen Beobachtungen. Neue Folge, 6 Bd. 30 Jahrg. der ganzen Reihe. Beobachtungen des Jahres 1901.

Preston, A. W.—Meteorological notes, 1901. From observations taken at Bradestone House, Brundall, Norfolk.

Raulin, V.—Les régimes pluviométriques saisonnaux des Iles Britanniques, d'après les observations des 25 années 1866–1890.

Regina, Department of Agriculture of the North West Territories.—Annual report. 1901.

Rome, Specola Vaticana.—Pubblicazioni. Vol. 6.

Rotch, A. L.—The circulation of the atmosphere in the tropical and equatorial regions.

—— The international aeronautical congress. [Berlin, May 20–24, 1902.]

Rousdon Observatory.—Meteorological observations for the year 1901, continued under the superintendence of the Honourable Lady Peek. Vol. 18.

Russell, H. C.—Current papers, No. 6.

—— Recurrence of rain. The relation between the moon's motion in declination and the quantity of rain in N.S. Wales.

St. Lucia, Botanic Garden.—Meteorological observations. 1901.

[*St. Petersburg, Chief Hydrographical Department.*—Meteorological and hydrological observations carried out in the summer of 1900, by the expedition of the North Frozen Ocean under the command of Colonel Vilkitzki.] In Russian.

Salonica, Gymnase Bulgare des Garçons "St. Cyrille et Method."—Bulletin annuaire de la station météorologique près du gymnase. 1901.

São Paulo, Commissão Geographica e Geologica. Secção Meteorologica.—Dados climatologicos. 1901.

Schwab, P. F.—Übev die Quellen in der Umgebung von Kremsmünster.

Singapore, Principal Civil Medical Officer, Straits Settlements.—Annual meteorological report, Straits Settlements, for the year 1901.

Strassburg, Meteorologischer Landesdienst.—Ergebnisse der meteorologischen Beobachtungen im Reichsland Elsass-Lothringen im Jahre 1898. Herausgegeben von . . . H. Hergesell.

Sutton, J. R.—Some pressure and temperature results for the great plateau of South Africa.

Sydney, Department of Public Instruction.—Results of rain, river, and evaporation observations made in New South Wales during 1899 . . . by H. C. Russell.

Tacubaya, Observatorio Astronómico Nacional.—Informes presentados a la Secretaria de Fomento por el Director del Observatorio Astronómico Nacional sobre los trabajos del establecimento desde Julio de 1899 hasta Diciembre de 1901.

Trinidad, Royal Botanic Gardens.—Annual report for year ending March 31st, 1902.

Tromholt, Sophus.—Catalog der in Norwegen bis Juni 1878 beobachteten Nordlichter Zusammengestellt von Sophus Tromholt. Herausgegeben von J. Fr. Schroeter.

Utrecht, Koninklijk Nederlandsch Meteorologisch Instituut.—Onweders, optische verschijnselen, enz., in Nederland. 1901, Deel 22.

Wallis, H. S., and *Mill, H. R.*—British rainfall, 1901. On the distribution of rain over the British Isles during the year 1901.

Washington, Department of Agriculture, Weather Bureau.—Bulletin I. W. B. No. 267. Eclipse meteorology and allied problems. Prepared . . . by F. H. Bigelow.

—— —— —— Bulletin No. 31. W. B. No. 265. Proceedings of the second convention of Weather Bureau Officials, held at Milwaukee, Wis., August 27–29, 1901. Edited under the direction of W. L. Moore . . . by James Berry and W. F. R. Phillips.

—— —— —— Bulletin No. 32. W. B. No. 268. Hurricanes: especially those of Porto Rico and St. Kitts. By W. H. Alexander.

Wellington, Meteorological Department.—[Meteorological observations in New Zealand.] 1901.

Zanzibar, Agricultural Department.—Annual report. 1901.

Zi-ka-wei Observatory.—Instructions for keeping the meteorological log.

—— —— —— —— Instructions in the use of meteorological instruments, compiled by R. F. Marc Dechevrens.

Zomba, Scientific Department.—Meteorology for the year 1901. Table of monthly mean values for Zomba and Fort Johnston. 2 sheets.

—— —— Rainfall at Zomba, B. C. A., from 1st November, 1897, to December, 1901.

—— —— Rainfall, 1901–2. British Central Africa Protectorate. Showing amount for the year 1901 and up to 31st March, 1902.

63, *Victoria Street, S.W., 22nd October*, 1902.

PRESENT:

SIR R. STRACHEY (IN THE CHAIR).

PROFESSOR DARWIN. | THE HYDROGRAPHER.

MR. SHAW (*Secretary*).

431. The minutes of the last meeting (8th October) were read and confirmed.

432. *London Fog Inquiry* (Minute 407).—The following draft letter to the County Council was approved, after amendment, as follows:—

LONDON FOG INQUIRY.

Meteorological Office,
63, Victoria Street, S.W.,
October, 1902.

SIR,

IN pursuance of an understanding arrived at in October of last year I have the honour, on behalf of the Meteorological Council, to report to you upon the work done in connexion with the initiation of an inquiry into the occurrence and distribution of fogs as follows:—

On November 10th the Council appointed Captain Carpenter, R.N., D.S.O., a member of the Council of the Royal Meteorological Society, to conduct the inquiry, and made the necessary arrangements for office accommodation and clerical assistance. Captain Carpenter at once put himself into communication with Captain Wells, R.N., the Chief Officer of the Metropolitan Fire Brigade, and made arrangements for the systematic observation of fogs at some of the river stations and at other stations of the Metropolitan Fire Brigade. He also arranged for supplementary observations to be taken at certain of the Metropolitan Police stations, at Battersea Park and Regent's Park, and at a number of Coast Guard stations in the Thames estuary, and by one or two private persons. Observations of temperature and other meteorological conditions were obtained from a number of the stations and from the parks; self-recording thermometers were installed on the Victoria Tower at Westminster, the Golden Gallery at St. Paul's, on the roof of the Meteorological Office, and at a private house at Banstead. Regular records of fog in accordance with a conventional scale distinguishing the kind and intensity of the fog were thus obtained from a series of points in or round London. The points were carefully selected to represent the local circumstances of geological formation, height above sea level, nearness to or remoteness from the river, open or crowded neighbourhoods. The instrumental readings combined with the information obtained in the ordinary course of the work of the Office supplied local and general information as to the meteorological conditions.

By arrangement with Captain Wells, special observations were made during fog or when fog was anticipated by the forecast branch of the Office, the intimation of the time for commencing the special observations being sent on receipt of requests from Captain Carpenter from the head office of the Fire Brigade to the stations by telephone.

The records thus obtained are exceedingly voluminous and contain particulars of all fogs occurring between the time of the initiation of the inquiry and the end of March, when observations were suspended. The records have all been examined and tabulated by Captain Carpenter, and the detailed history of the occurrence and progress of each fog carefully traced and compared with the meteorological and other conditions. The report upon the observations is appended hereto. A tabular statement giving a summary of the particulars of each fog is given on page of the report. It is to be regretted that the earlier fogs of the winter, which occurred before the inquiry was commenced, could not be included.

For the details of the different questions which are discussed, Captain Carpenter's report must be referred to, but I am directed to call attention to a few points.

(1.) In the first place, as was expected, considerable difficulty arose in regard to the specification of the nature and intensity of fogs. The only means of estimating them are by noting their effect on the visibility of objects, and visibility depends upon a number of incidental circumstances in addition to the actual density of the fog: upon the time of day or night, the position of the observer, as well as, to some extent, upon his temperament. The records required careful consideration from this point of view, and instructions to observers had to be revised and modified, and inquiry made from time to time as to outstanding inequalities. The first result of the inquiry is accordingly the suggestion of a scale of fog intensity arranged according to the interference with traffic upon road, rail, river or sea, and represented by the serial numbers 0 to 5. Particulars of this proposed scale are given on page

(2.) Passing on to the results derived from the records, it should be noted that when there is no fog properly so-called, the direct effects of household smoke are much greater than might be supposed. From the observations on St. Paul's and the Victoria Tower, by Captain Carpenter himself, and his assistant, Mr. W. D. Matthews, it appears that on account of the smoke the extreme limit of visibility in winter from an elevated position in London, under most favourable circumstances, is set at 1½ miles. That limit is diminished as the tendency to form fog is developed until the well-known effects of dense fog are reached.

(3.) The stations at which fogs were observed, and the comparative frequency of fogs at the stations, as derived from the observations hitherto obtained, are set out in a table on page .

The results may be enumerated as follows :—

(*a.*) There is no evidence of any special connexion between the frequency or intensity of fogs and geological conditions, nor does the locality of the commencement of fog depend upon geological formation.

(*b.*) The well-known circumstance that elevated stations are freer from fog than other stations is confirmed.

(*c.*) The commencement of a fog is not identified with any particular locality ; it seems to be a general process depending upon general atmospheric conditions. The actual locality of fog at any particular time seems to depend upon local atmospheric conditions which require further investigation. There is no evidence tending to show that fogs are formed outside and invade or drift into London. The London fogs are produced in London, possibly at the same time as country fogs, but they do not come from the country.

(*d.*) The meteorological conditions for the formation of fog are very carefully set forth and illustrated in pages The conditions considered include (i.) barometric pressure, (ii.) atmospheric temperature, (iii.) river temperature.

(i.) The barometrical conditions are illustrated by a series of charts of the distribution of barometric pressure in North-west Europe, taken from the Daily Weather Charts of the Meteorological Office.

Observations and diagrams are given tending to show a slight indraught of air from all sides to the central parts of London during dense fogs.

(ii.) No severe fog occurred with an air temperature above 40° F. The minimum air temperature prior to fog coming on averaged 9° below the normal mean temperature for the day (which ranges between 39° F. and 45° F. during the winter months). On 23 out of 46 occasions where fog commenced it was associated with a fall of the daily minimum of temperature, but on the other 23 occasions the fog was associated with a steady or rising minimum of temperature.

(iii.) During the period of observations (3rd January to 11th March) the river temperature was reported as ranging from 32° F. to 48° F. In 22 cases out of 25 during the nights preceding days of fog the temperature of radiation, as indicated by a thermometer on the grass at Regent's Park, fell much below the river temperature, the amounts of difference on these occasions varying from 6° to 25°.

(*e*) There is a very marked tendency for fogs to commence in the early morning, when the temperature is lowest, after a clear night, as in the open country, and the differences of fogs on different occasions in London, as compared with the country, depend largely upon whether the conditions are favourable for the dispersal of the early morning fog.

The main purpose of the inquiry is to determine (1) whether or not it is possible to anticipate the formation or dispersal of fog in London more definitely and certainly than at present, and whether it is possible to warn one part of London, (2) from observations of actual occurrence of fog made in other parts, or (3) from special readings of thermometers or other instruments.

As regards (1), Captain Carpenter's conclusions render somewhat more definite the conditions of occurrence, and hence add to the efficiency of forecasting.

As regards (2), it seems improbable that any result can be obtained.

The third question is undecided, and Captain Carpenter advises further investigation should be made. His opinion is expressed thus : "A regular system of observations of temperature might indicate the possibility of local forecasting, especially if these were made in the early hours of the morning." To test this suggestion the inquiry has been reopened in the present winter, and special arrangements for the observation of temperature at various stations have been made even at the early hour of 5 a.m.

Attention should be called to one point of special importance in connexion with temperature observations which requires to be followed up. On 7th March, during a dense fog, the temperature in the streets of London was nearly 10 deg. below that on the roof of the Meteorological Office, the elevated stations, and the surrounding country on the Southern and Western sides. This indicates the importance of making further investigation of the vertical distribution of temperature, but at present no adequate means of making such an investigation exist.

If Captain Carpenter's suggestion of a more complete investigation of the effect of possible irregularities in the distribution of temperature be carried out, the outstanding part of the inquiry would be—

(1.) To ascertain whether the proposed scale of classification of fogs puts the observations of locality upon a satisfactory footing, and whether additional observations throw any further light on local distribution ;

(2.) To compare the effect of local temperature differences with local distribution of present or subsequent fog ;

(3.) To ascertain whether it is possible to make arrangements for the investigation of the vertical distribution of temperature.

The cost of the inquiry defrayed by the Meteorological Council up to the 30th September (exclusive of the cost of instruments supplied from the Office stock) has been as follows :—

	£	s.	d.
Payments to Capt. Carpenter	100	0	0
Clerical assistance	64	15	9
Instruments and miscellaneous expenses	70	2	3
Total	234	18	0

I am to request that a remittance of this amount may be made to this Office.

To carry on the inquiry to the end of the present winter will probably cost £200. I am to ask whether the London County Council are prepared to find the funds for this additional work. In that case the Council will issue a further report upon the inquiry in the summer or autumn of 1903.

The Council regret that Captain Carpenter is himself unable to continue the investigation on account of his health. The conduct of the inquiry is provisionally placed in charge of Mr. R. G. K. Lempfert, M.A., who has recently been appointed Scientific Assistant to the Secretary of the Meteorological Council.

With these observations I am directed to ask if you will lay this matter before the County Council, and to request that I may be favoured with an intimation of their wishes at an early date, to admit of such arrangements being carried out as may appear to be requisite for the further prosecution of this inquiry, if it be decided to continue it, which the Meteorological Council hope may be found possible.

I am, &c.,
W. N. SHAW.

The Clerk to the
County Council of London.

433. *Observations from Uganda* (Minute 363).—The Secretary submitted a summary of the Uganda observations for 1901, and was authorised to forward a copy to the Foreign Office with a letter intimating that the question of printing a summary of observations from stations in Colonies and Dependencies was under consideration, but that there was no immediate intention of printing the Uganda observations for 1901, and calling attention to the fragmentary character of some of the records.

434. *War Office.—Experiments at Shoeburyness.*—Read—the following letter :—

M.O. 1,895.

METEOROLOGICAL RECORDS.

Shoeburyness,
14th October, 1902.

DEAR SIR,

THANKS for your letter of the 10th inst. and enclosure (Circular 27).

I gather that you can send me the Daily Weather Report posting at 2.30 free of charge. If that is the case I shall be glad to receive it.

The other requirement of this Office would be notices of atmospheric disturbances by telegram.

Would the Council be prepared to pay the cost of telegraphing if, in exchange, I were to supply you with continuous record showing velocity of wind (Dines' anemometer), atmospheric pressure (barograph), temperature (thermograph), or any other information you may desire.

A sheet is appended showing the form in which weather notes are recorded here.

Rainfall measured here has been communicated to "British Rainfall" for many years.

I notice that the Plymouth Corporation does not send you anemographic records from the Dines' anemometer erected on the Hoe.

Yours faithfully,
F. M. LOWE, Major, R.A.,
For Supt. of Experiments (absent on leave).

To the Secretary,
Meteorological Office.

The Secretary was authorised to send an official copy of the Daily Weather Report and to place the Superintendent of Experiments, Shoeburyness, provisionally upon the lists of recipients of Storm Warnings, upon the understanding that the Superintendent

will forward a copy of the record of velocity of wind (Dines' Anemometer), and that the arrangement may be terminated at the discretion of the Council.

435. *International Committee—Meeting at Southport in September*, 1903 (Minute 253). —A general approval was given to a suggestion that the Council should make special arrangements for the representation of the system of forecasting from telegraphic reports at Southport in connexion with the meeting of the International Committee, and the Secretary was requested to make specific proposals with regard to the suggestion.

436. *Fish Trades Gazette* (M.O. 1,924).—The Secretary was authorised (1) to arrange for a weekly summary of the weather in the several fishing districts, to be compiled by the Marine Superintendent or one of the members of the staff of the Office, in general accordance with Mr. Hyde's wishes, the summary to be 750 words in length, more or less, and to be charged for at the rate of 27*s.* 6*d.* per week ; and (2) to pay over the amounts received for the compilation of the articles, provided that the work is regarded as additional to, and does not interfere with, the ordinary work of the Office.

437. *Valencia Magnetic Observations* (Minute 241).—It was agreed that the magnetic observations at Valencia be continued on the same terms as before until January 31st, 1903.

438. *Instruments—Breakage of Barometers in Transit* (Minute 256).—Reported—that one of the four barometers sent to the Cape, in accordance with Minute 256, had been broken in transit.

The Hydrographer suggested that further trial should be made with a flexible hamper of a pattern similar to those used by the Admiralty for packing chronometers, and it was resolved to make the trial as suggested.

439. *Inspections—Reports of Inspectors.*—The following directions were given upon matters arising out of the reports :—

i. To communicate with the Royal Meteorological Society respecting the supply of muslin and wick to stations from which returns are obtained for the Office.

ii. To invite Mr. Prigg, of Plymouth, to send daily returns of 9 p.m. readings by post card for the Daily Report.

iii. To communicate with the authorities at Queen's College, Belfast, respecting the observations at that station.

iv. To incorporate with the Office returns returns from such of the stations reporting for the Registrar-General as are effective for the ordinary work of the Office, and to prepare a memorandum on the cost involved in the work of preparation of special returns for the Registrar-General's reports.

v. To supply a specification for making a Stevenson screen to Mr. Challis, head gardener at Wilton House.

vi. To have the necessary repainting carried out at Holyhead and at Scilly in accordance with the recommendations in the report.

vii. To communicate with the Irish Board of Works with regard to the reports as to the position of the anemometer at Kingstown.

viii. To lend a sunshine recorder to Bournemouth while those at that station are sent to Kew to be tested.

ix. To report upon the amount of constriction of barometers and the limitation thereby imposed upon the accuracy of reading the instruments.

x. To continue the instruction of Minute 172 directing that thermometers with errors exceeding ·5° F. should be recalled from telegraphic reporting stations and replaced.

440. *Logs.*—Seven received, two excellent. One short log.

441. *Forecasts.*—Submitted—The following report on the Forecasts, issued at 8.30 p.m. daily, during the month of September, 1902 :—

The letters used have the following signification :

a = complete success. | c = partial failure.
b = partial (*i.e.*, more than half) success. | d = total failure.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success. a + b.
Scotland, N.	a	33	50	42	84
,,	b	47	37	42	
,,	c	20	13	16	
,,	d	0	0	0	
Scotland, E.	a	33	67	50	92
,,	b	61	23	42	
,,	c	3	10	7	
,,	d	3	0	1	
England, N.E.	a	47	47	47	96
,,	b	50	47	49	
,,	c	0	6	3	
,,	d	3	0	1	
England, E.	a	47	50	49	100
,,	b	53	50	51	
,,	c	0	0	0	
,,	d	0	0	0	
Midland Counties	a	57	57	57	99
,,	b	43	40	42	
,,	c	0	3	1	
,,	d	0	0	0	
England, S.	a	57	60	59	97
,,	b	37	40	38	
,,	c	6	0	3	
,,	d	0	0	0	
Scotland, W.	a	53	57	55	90
,,	b	37	33	35	
,,	c	7	10	9	
,,	d	3	0	1	
England, N.W.	a	37	67	52	90
,,	b	53	23	38	
,,	c	7	10	9	
,,	d	3	0	1	
England, S.W.	a	27	67	47	94
,,	b	63	30	47	
,,	c	10	3	6	
,,	d	0	0	0	
Ireland, N.	a	37	84	61	86
,,	b	37	13	25	
,,	c	23	3	13	
,,	d	3	0	1	
Ireland, S.	a	53	70	62	95
,,	b	37	30	33	
,,	c	10	0	5	
,,	d	0	0	0	
Summary.					
British Islands	a	45	62	53	93
,,	b	46	33	40	
,,	c	8	5	6	
,,	d	1	0	1	

442. *Storm Warnings:—*

The signals were hoisted on four days, the total number of districts warned, 23.
In nine districts the warnings were justified by subsequent gales (forces 8 and upwards), and in ght districts by subsequent strong winds (force 6 or 7). In six districts they were not required.

GALES EXPERIENCED, FOR WHICH NO WARNINGS WERE ISSUED.

None.

443. *Accounts.*—Submitted—The following statement:—

	£	s.	d.
Cash balance on 7th October	5,072	11	8
Receipts from 8th to 21st October	240	12	8
	5,313	4	4
Cheques drawn from 8th to 21st October	180	17	3
Cash balance on 21st October	£5,132	7	1

444. *Library.*—(1) The fitting up of a bookcase 12 feet wide in room 14, by the Library Supply Company, at a cost of £14 was approved.

(2) The Secretary reported that, during the summer cleaning, the books had been dusted out of office hours by two of the Messengers at a cost of £3 3*s*., with a special machine purchased from the Library Supply Company at a cost of £4 16*s*.

Approved.

445. *Library.*—Publications received since the last meeting:—

[*Adelaide Observatory.*]—Rainfall in South Australia and the Northern Territory during 1899 with weather characteristics of each month. By Sir C. Todd.

* *Angot Alfred.*—Abrégé des instructions météorologiques.

Berlin, Königlich Preussisches Meteorologisches Institut.—Bericht über die Thätigkeit . . . im Jahre 1901, von W. von Bezold.

Cooper, A. J.—The causes of weather and earthquakes.

Cordoba, Oficina Meteorológica Argentina.—Anales. Tomos 10, 11, 12, Partes 1 y 2. 4 vols.

Exner, Felix M.—Versuch einer Berechnung der Luftdruckänderungen von einem Tage zum nächsten.

Kremsmünster, Sternwarte.—Resultate aus den im Jahre 1901 auf der Sternwarte zu Kremsmünster angestellten meteorologischen Beobachtungen. Von Prof. P. T. Schwarz.

Lawes Agricultural Trust.—The Rothamsted experiments. Plans and summary tables, arranged for reference in the fields. 1902.

Marseilles, Commission de Météorologie du Département des Bouches-du-Rhone.—Bulletin annuel. Année 1901, 20^{me} année.

Polis, P.—Der Platzregen im mittleren Maas- und im Roergebiete vom 30. Juni, sowie die Dauerregen in Westdeutschland und Belgien vom 14. und 15. September 1901.

Rio Janeiro Observatorio.—Annuario. 1902, Anno 18.

Tasmania.—Handbook of Tasmania.

Washington, Department of Agriculture, Weather Bureau.—Report of the Chief of the Weather Bureau. 1900-1901. Vol. 1.

* Purchased.

446. The Twelfth Annual General Meeting of the Meteorological Council was held at 63, Victoria Street, on Wednesday, 5th November, 1902, at the hour of 2h. 30m. p.m.

The following Members were present :—

Sir R. STRACHEY, in the Chair.

Mr. Buchan.	Mr. Scott.
Prof. Darwin.	The Hydrographer.
Mr. Dines.	Mr. Shaw (Secretary).

The Secretary read the notice convening the meeting as follows :—

Meteorological Office,
October 27th, 1902.

Sir,

I beg to inform you that the twelfth ordinary general meeting of the Meteorological Council will be held on Wednesday, the 5th proximo, at 2h. 30m. p.m., for the receipt of the Report of the proceedings of the Council during the past year, the consideration of the Annual Report for the year ended March 31st, 1902, the consideration of the Estimates for 1903–4, and the transaction of other ordinary business.

A copy of the Annual Report of the Council is enclosed herewith; a copy of the report of the proceedings of the Council for the past year and of the Estimates proposed for 1903–4 will be sent in due course.

I am, &c.,
W. N. Shaw,
Secretary.

The report of the Directors was read as follows :—

The Directors report that in accordance with the articles of association :—

1. The Report of the Council for the year ended March 31st, 1902, which has been circulated to members of the Council, has been submitted to the Royal Society for presentation to Parliament.

2. The estimates for the year 1902-3, as adopted at the last ordinary general meeting, have been submitted to the Treasury and approved.

3. The accounts for the year ended March 31st, 1902, after examination by two members of the Council, have been submitted to audit by the Exchequer and Audit Department.

4. That meetings of Directors have been held on the following days :—

1901	...	November	6	1902	...	February	14	1902	...	May	23
,,	...	,,	20	,,	...	,,	28	,,	...	June	6
,,	...	December	4	,,	...	March	14	,,	...	,,	20
,,	...	,,	18	,,	...	April	11	,,	...	July	4
1902	...	January	17	,,	...	,,	25	,,	...	October	8
,,	...	,,	31	,,	...	May	9	,,	...	,,	22

5. That the Minutes of the proceedings have been regularly recorded and printed.

The report was adopted.

Estimates.—Submitted the following memoranda :—

MATERIALS for preparing ESTIMATES for 1903–1904.

	Estimated Expenditure 1903–1904.		Voted for 1902–1903.
	£	£	£
Administration :			
(1.) Council, including portion of Secretary's salary	—	850	875
(2.) Secretary, less fees as member of Council	—	625	625
(3.) Salaries :			
Chief Clerk	333		
3 Junior Clerks	440		
Office Keeper	95		
2 Messengers	117		
Caretaker	100		
	1,085		
Transfer to *Weather Information* £110			
„ *Care of Instruments* 15			
	125		
		960	940
(4.) Rent, fuel, and lighting :			
Rent	635		
Fuel	55		
Lighting	40		
		730	750
(5.) Incidental and contingent expenses :			
Office Keeper's contingent account	73		
Postage	96		
Carriage of parcels, &c.	18		
Books and Printing	48		
Sundries	20		
	255		
(5*a*.) Furniture and office repairs	86		
(5*b*.) Expenses incidental to International Meteorological Congress	—		
	341		
Deduct repayments and commission	31		
		310	360
Special Researches and Experiments :			
(1.) Salaries :			
Secretary's Special Assistant	300		
1 Junior Clerk	150		
Female Staff (3 in number)	264		
	714		
Transfer from head *Land Meteorology*	250		
	964		
(2.) Other charges :			
Anemometers at Holyhead	12		
Sundries	14		
		990	870
Carried forward	—	4,465	4,420

	Estimated Expenditure 1903–1904.		Voted for 1902–1903.
	£	£	£
Brought forward	—	4,465	4,420
Land Meteorology:			
(1.) Observatories and stations:			
Aberdeen allowance	275		
Armagh „	50		
Ben Nevis „	100		
Falmouth „	250		
Fort William „ (3 quarters)	190		
Glasgow „	75		
National Physical Laboratory allowance	400		
Stonyhurst allowance	56		
Valencia	482		
Six Anemograph stations and St. Helena	84		
Meteorological Societies (Observations 2nd Order, Form A. (details) 7 stations. Form B. (results) 28 stations).	165		
Forms, &c.	56		
	2,183		
Deduct receipts for grazing, sale of forms, &c.	28		
		2,155	2,170
(2.) Salaries: Discussion and reduction of observations:			
Observatories:			
1 Senior Clerk	290		
3 Junior Clerks	410		
1 Boy Clerk	33		
Transfer from *Weather Information*	100		
	833		
Transfer to head *Special Researches*...	250		
(*a.*)	583		
Stations of Second Order, Reports from Foreign Stations and Library:			
1 Senior Clerk	275		
5 Junior Clerks	755		
1 Unclassified Clerk	59	1,330	1,370
2 Messengers...	130		
	1,219		
Transfer to *Weather Information*	472		
(*b.*)	747		
Weather Information and Forecasts:			
(1.) Telegraphic reports and storm warnings:			
Reports from inland stations	453		
Reports from abroad	135		
Reports sent abroad	547		
Storm warnings	220		
Hay harvest forecasts	45		
Private wires	57		
Sundry telegrams, forecasts, &c.	175		
Payments to reporters, &c. (allowances and expenses) ...	656		
Postage of reports and forecasts	253		
Instruments, &c.	50		
Weekly Reports	50		
Sundries	27		
	2,668		
Deduct repayments	968		
		1,700	1,700
Carried forward	—	9,650	9,660

	Estimated Expenditure 1903–1904.		Voted for 1902–1903.
	£	£	£
Brought forward	—	9,650	9,660
(2.) Salaries: Preparation and issue of reports and forecasts:			
2 Senior Clerks	535		
4 Junior Clerks	595		
1 Boy Clerk	44		
Addition for late evening and Sunday attendance, and for extra work	204		
	1,378		
Transfer from *Administration* £110			
„ *Land Meteorology* 372			
	482		
		1,860	1,870
Inspections:			
Mr. Buchan, salary and travelling expenses	190		
Kew Inspectors, travelling expenses	60		
Other Inspections „	125		
Royal Meteorological Society, contribution towards cost of their inspections	25		
		400	400
Ocean Meteorology and supply of Instruments:			
(1.) Salaries: Discussion and reduction of observations:			
Marine Superintendent	400		
1 Senior Clerk	275		
5 Junior Clerks	785		
2 Boy Clerks	75		
	1,535		
Deduct proportion chargeable to care and issue of instruments	165		
		1,370	1,320
(2.) *Care and issue of Instruments:*			
Proportion chargeable for Salaries:			
From *Ocean Meteorology*	165		
„ *Administration*...	15		
		180	160
Instruments, repairs, &c., for the Royal Navy	—	400	400
Instruments, repairs, &c., for the Mercantile Marine ...	136		
Agents' fees and incidental charges...	60		
	196		
Deduct repayments under this head	37		
	159		
Instruments for Stations (repaid by *Weather Information*)	—		
Miscellaneous	61		
		220	230
Superannuation:			
Mr. Scott	400		
Capt. H. Toynbee	144		
Payments to R. Strachan	142		
Reserve	750		
	1,436		
Deduct receipts:			
Annuity £142			
Interest 74			
	216		
		1,220	1,260
Totals .. .. £	—	15,300	15,300

SYNOPSIS of OFFICE SALARIES.

Service.	Proposed for 1903–1904.	Voted for 1902–1903.	1903–1904. Increase.	1903–1904. Decrease.
	£	£	£	£
Administration (not including Council)...	1,585	1,565	20	—
Special Researches	964	670	294	—
Land Meteorology	1,330	1,370	—	40
Weather information	1,860	1,870	—	10
Ocean Meteorology	1,550	1,480	70	—
Totals	7,289	6,955	384	50

METEOROLOGICAL OFFICE. ESTIMATES for the Year 1903–1904.

Heads of Service.	Proposed for 1903–1904.		Voted for 1902–1903.		1903–1904. Increase.	1903–1904. Decrease.
	£	£	£	£	£	£
Administration:						
Payment of Council	850	—	875	—	—	—
Secretary (less fees as member of Council)	625	—	625	—	—	—
Salaries and wages	960	—	940	—	—	—
Rent, fuel, and lighting	730	—	750	—	—	—
Incidental and contingent expenses ...	310	—	360	—	—	—
		3,475		3,550	—	75
Special Researches and Experiments:						
Salaries and other charges	—	990	—	870	120	—
Land Meteorology:						
Observatories and stations	2,155	—	2,170	—	—	—
Salaries: Discussion and reduction of observations	1,330	—	1,370	—	—	—
		3,485		3,540	—	55
Weather Information and Forecasts:						
Telegraphic reports and storm warnings ...	1,700	—	1,700	—	—	—
Salaries: Preparation and issue of reports and forecasts	1,860	—	1,870	—	—	—
		3,560		3,570	—	10
Inspections:						
Salaries and travelling expenses	—	400	—	400	—	—
Ocean Meteorology:						
Salaries: Discussion and reduction of observations	1,370	—	1,320	—	—	—
Expenses incidental to the supply of instruments	800	—	790	—	—	—
		2,170		2,110	60	—
Superannuation	—	1,220	—	1,260	—	40
Totals	—	15,300		15,300	180	180

The estimates were approved, and the Secretary was instructed to forward a copy to the Treasury (P.C. 2695).

Read—the following letter (M.O. 2,076) from Professor Schuster :—

(M.O. 2,076.)

Victoria Park, Manchester,
November 4th, 1902.

DEAR SIR RICHARD,

I AM unable to attend the meeting of the Meteorological Council to-morrow, and I am specially sorry because it had been my intention to bring what I consider to be an important and urgent matter to the notice of the Directors.

Some of the recent researches in physics, notably those connected with atmospheric electricity, have an important bearing on meteorology. That the Meteorological Council is fully alive to this is shewn by the fact that they have, a few years ago, set aside a sum of money to enable Mr. Wilson to carry on some of his researches. I also believe that atmospheric electricity has always been considered to come within the sphere of influence of the Council. The variations of terrestrial magnetism, in particular the diurnal variations, are recognised to be due to air currents, probably in the upper regions of the atmosphere. Their connexion with the diurnal variation of the barometer is a matter that requires further elucidation, and, generally speaking, the connexion between terrestrial magnetism and meteorology is becoming more intimate.

You are aware that Kew Observatory has, so far, acted as central station for the records of terrestrial magnetism and of atmospheric electricity, but that owing to the disturbances caused by electric trams, a new magnetic observatory has to be established. The choice of site, as well as the organisation of the observatory, is at present under the consideration of the executive committee of the National Physical Laboratory; but the funds of the Laboratory being insufficient it will be necessary to apply for a grant to the Treasury for building purposes, and also for the maintenance of its staff.

There seems to me in all this a great danger that subjects intimately related to meteorology will definitely, at any rate for the present, be handed over to an institution which was created for a different purpose, and which already has its hands full with matters specifically pertaining to it.

I would therefore like the Directors to consider whether they should not approach the Council of the Royal Society with a view to discussing, jointly with the authorities of the National Physical Laboratories, what the organisation of the new observatory is to be, and what connexion may be established between it and the Meteorological Council. They may, I think, reasonably claim that at any rate the subject of atmospheric electricity should remain in charge of the Meteorological Office.

I hope that you will not think that I am exceeding my functions as a member of the Council by writing to you, but I understood, when present at one of the meetings, that members, who are not Directors, might offer once a year a suggestion for consideration by the Directors.

I will, therefore, leave the matter in your hands, and only add that if it is found advisable to move in the matter it must be done at once, as the whole subject will be settled in the near future.

ARTHUR SCHUSTER.

A general concurrence with Professor Schuster's suggestion was expressed, and it was resolved that the matter be referred to the Directors.

The meeting then adjourned.

63, *Victoria Street, S.W., 5th November*, 1902.

At a meeting of Directors held after the General Meeting :—

PRESENT :

SIR R. STRACHEY, IN THE CHAIR.

MR. BUCHAN.	THE HYDROGRAPHER.
PROFESSOR DARWIN.	MR. SHAW, *Secretary*.

447. The Minutes of the last meeting (22nd October) were read and confirmed.

448. *Treasury Enquiry.*—The following draft letter to the President of the Royal Society was approved (P.C. 2607) :—

Meteorological Office,
63, Victoria Street, London, S.W.,
November 5th, 1902.

DEAR SIR WILLIAM HUGGINS,

I HAVE the honour to bring to the notice of the President and Council of the Royal Society that, following on a question that was put in the House of Commons on the application of the grant to the Meteorological Council, the Council were informed that it was the intention of the Treasury to cause an enquiry to be made into the administration of the grant similar to that carried out in the year 1877. It being at the same time intimated that, pending the result of such an enquiry, the Treasury wished that the contribution in aid of the Observatory at Fort William should not be discontinued, as had been intended by the Meteorological Council, this wish will be complied with.

The circumstances under which the Observatory at Fort William was established with the aid of a grant from the Meteorogical Council, and those that led to the resolution to discontinue the grant after the end of the present year, have been fully explained in the past Reports of this Council to the Royal Society; and the subject calls for no further remark here beyond the statement that the Council, having for some time past found difficulty in meeting other demands on the funds at their disposal which they regard as obligatory, decided that the maintenance of the Fort William Observatory did not justify the continuance of the grant.

In the year 1898 the Meteorological Council represented to the President and Council of the Royal Society that they anticipated considerable difficulty in making provision for the superannuation of their staff, which had become imperatively necessary, without trenching on outlay needed for other important objects, unless some increase were made to the funds at their disposal, and the Royal Society was consequently requested to support them in a request to the Treasury for an annual addition of £1,200 to their grant, to admit of a superannuation scheme being carried out. The President and Council of the Royal Society, while recognising that a superannuation arrangement was essential, expressed the belief that economies might be found possible which would suffice for meeting this object, but, after it had been provided for, if it should be found that the work of the Meteorological Council had been seriously affected, the time would be appropriate for approaching the Government for further aid.

The President and Council of the Royal Society are aware that the contemplated system of superannuation has been brought into operation, but it has necessarily been accompanied by a corresponding restriction of the work of the Meteorological Office, and it has for some time past been under the consideration of the Council whether they should not make a fresh application to the Royal Society on the subject of an increase to the annual grant. They now feel, however, that the proposed enquiry into the working of the Office will afford a convenient opportunity for discussing the whole subject of the legitimate requirements of a national system of meteorological observation and investigation, and they may confidently anticipate the support of the Royal Society to any well-established proposals for adding to the efficiency of the existing organisation and administration.

I am, &c.,
R. STRACHEY
(Chairman).

Sir William Huggins, K.C.B., D.C.L., LL.D.,
President of the Royal Society,
Burlington House, W.

449. *National Physical Laboratory.*—The Secretary was directed to prepare a draft of a letter to the Royal Society enclosing, with Professor Schuster's permission, a copy of his letter, referred by the general meeting of the Council to the directors (Minute 446), and expressing the concurrence of the Council in Professor Schuster's suggestion.

450. *Aberdeen Observatory and Telegraphic Reporting Station* (Minute 410).—Dr. Buchan reported the receipt of a letter (M.O. 2,075) from Professor Niven stating

that he had arranged, subject to the sanction of the Council, with Mr. George A. Clarke to take up the work, and suggesting that arrangements should be made for him to receive some preliminary training at Kew in handling the photographic sheets and using the self-recording instruments.

The Secretary was directed to write defining the understanding with Professor Niven upon the matter, and to arrange for the preliminary training as suggested, any necessary charges in connexion therewith being borne by the Council.

451. *Telegrams from the Azores* (Minute 412).—Read—Letter (M.O. 2,007) from the Post Office asking for a reply as soon as possible with regard to the suggestion of receiving messages *via* Waterville.

The Secretary reported that he had seen the traffic manager of the Eastern Telegraph Company, who had already been in correspondence with the Post Office on the matter, and raised no objection to the Commercial Company transmitting a daily meteorological telegram free of charge ; he was authorised to arrange for the telegrams to be sent as suggested, and for the transfer to take place at once without waiting to decide, in consultation with M. Mascart, what form the messages should take in the future.

452. *Storm Warning Telegrams, Courtown.*—Read—Letters (M.O. 1,946 and 2,008) from Mr. G. W. Hely-Hutchinson, of Invernore House, Courtown Harbour, Co. Wexford, asking on behalf of the Harbour Commissioners of Courtown to be supplied with storm warning telegrams and an Official copy of the Daily Weather Report, and giving particulars of the shipping and fishing trade of the Harbour.

The application was granted.

453. *Logs.*—Twelve received, one excellent ; also two short logs.

454. *Storm Warnings:*—

Signals hoisted on six days, number of districts warned, 26.

In eight districts the warnings were justified by subsequent gales (force 8 and upwards) and in 10 districts by strong winds (forces 7 or 6). In eight districts they were not required.

Gales experienced, for which no warnings were issued.—None.

FREDC. GASTER.

455. *Harvest Forecasts.*—Return for 1902.

The NUMBER of RECIPIENTS of the FORECASTS for various periods in the SUMMER of 1902 as compared with 1901 is as follows :—

District.	Number of Recipients.	
	1901.	1902.
0. SCOTLAND, N.	—	—
1. SCOTLAND, E.	2	—
2. ENGLAND, N.E.	3	1
3. ENGLAND, E.	5	9
4. MIDLAND COUNTIES	22	21
5. ENGLAND, S.	18	24
6. SCOTLAND, W.	—	—
7. ENGLAND, N.W.	6	11
8. ENGLAND, S.W.	7	6
9. IRELAND, N.	1	—
10. IRELAND, S.	1	2
Totals	65	74
Total number of Telegrams ...	1,587	2,790

456. *Forecasts for October.*—Submitted.—The following Report on the Forecasts issued at 8.30 p.m. daily during the month of October, 1902 :—

The letters used have the following signification :—
a = complete success. | c = partial failure.
b = partial (*i.e.*, more than half) success. | d = total failure.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success. a + b.
Scotland, N.	a	36	52	44	81
"	b	45	29	37	
"	c	16	13	15	
"	d	3	6	4	
Scotland, E.	a	29	45	37	90
"	b	58	48	53	
"	c	10	7	9	
"	d	3	0	1	
England, N.E.	a	42	55	49	89
"	b	52	29	40	
"	c	6	16	11	
"	d	0	0	0	
England, E.	a	45	45	45	81
"	b	39	32	36	
"	c	10	23	16	
"	d	6	0	3	
Midland Counties	a	42	61	52	83
"	b	42	20	31	
"	c	13	19	16	
"	d	3	0	1	
England, S.	a	49	49	49	80
"	b	29	32	31	
"	c	16	19	17	
"	d	6	0	3	
Scotland, W.	a	32	52	42	92
"	b	58	42	50	
"	c	10	6	8	
"	d	0	0	0	
England, N.W.	a	49	52	51	83
"	b	29	35	32	
"	c	19	13	16	
"	d	3	0	1	
England, S.W.	a	32	45	39	85
"	b	48	45	46	
"	c	20	10	15	
"	d	0	0	0	
Ireland, N.	a	32	55	44	92
"	b	52	45	48	
"	c	16	0	8	
"	d	0	0	0	
Ireland, S.	a	39	48	44	96
"	b	55	49	52	
"	c	6	3	4	
"	d	0	0	0	
Summary.					
British Islands	a	39	51	45	87
"	b	46	37	42	
"	c	13	12	12	
"	d	2	0	1	

457. ***Reports of Work*—October, 1902 :—**

MARINE BRANCH.

November 4th, 1902.

Examined 19 new meteorological logs and 3 short meteorological logs.

Discussion south of the Equator, between the west coast of Africa and 90° W. longitude. Preparing Ocean charts for engraving and publication, also examining Admiralty Sailing Directions for notes of wind and weather on African coast. March and April Charts completed and sent for engraving. January proof examined and returned for correction.

Indian Ocean District—from latitude 30° N. to 30° S.—Preparing and extracting data in Office logs.

Monthly Pilot Chart of the North Atlantic and Mediterranean. November chart passed for press. First proof of December received from lithographer and returned for revise. Charting sea temperatures for August, September, and October, 1902; also charting pressure observations for October, 1902. Registering and acknowledging reports of Ice and Sea Temperatures, and issuing Charts and fresh supplies of Forms. 173 reports containing observations to be used for the charts received during the month.

Sailing Directions for North Sea and China Sea. Results of meteorological observations at six stations for North Sea completed and fowarded to Admiralty. The results for new issue of China Sea Pilot considerably advanced.

African meteorological reports—assistance given in abstracting observations.

Map of London for Fog Enquiry—a reduction of map prepared.

CAMPBELL HEPWORTH.

TELEGRAPHIC BRANCH.

Daily Weather Reports.—All numbers issued promptly; corrections and additions for *September* issued. New copy for Maps IV. and V., page 2 prepared up to end of this year. *New Tables, &c.*, necessary for this purpose copied and mounted.

Weekly Weather Reports.—Charts, daily remarks, and general notes, &c., prepared and issued promptly. *Monthly Supplement.*—First summary, some of maps, &c., done to *September*, and all gone finally to press.

Storm Warning Checking.—Primary, for 1902, done to date.

Forecast Checking.—8.30 p.m., daily (done to date by Mr. Lempfert), summarised in this branch.

Report on Times of Arrival of Foreign Telegrams.—Done to 31. VIII.

Checking Observatory Records, &c.—See Observatory Branch.

Inquiries by Telegraph.—Answered, 14.

FREDK. GASTER.

OBSERVATORY BRANCH.

October 31st, 1902.

Hourly Means.—Volume for 1899. Proof has been read and passed for press up to page 208, leaving about 30 pages to complete the volume. Very little progress has been made during the month with the volume for 1900.

Supplement to Temperature Tables.—This work was finally passed for press on the 9th instant.

Examination Work.—The tabulations required for the return sent to the Registrar General for Ireland have been examined : and the general examination has been advanced a little.

Wind Data for East Coast of England.—Tables of frequency of wind force have been obtained from 12 years' anemometer observations at Yarmouth, and from six years' logs kept on board the "Shipwash" and "St. Nicholas" light vessels.

Miscellaneous.—A necessary re-arrangement of curves and tabulations has been made, and a large accumulation of data has been sorted out, tied up, and labelled; this work is not yet completed.

Ben Nevis Observations for September, 1902, and for several days throughout 1901, have been made for Prof. Hergesell.

Harmonic co-efficients for the annual curve of mean minimum temperature at Kew have been calculated from five-day means.

Holyhead anemograms have been tabulated each week and sent to Dublin.

During the month the Forecast Branch has (1) made remeasurements of curves, and a comparison of the tabulated and standard readings, for four observatories for the month of September; and (2) tabulated Deerness anemograms to end of August (3½ months), and Shields anemograms for April and May, 1902.

R. H. CURTIS.

MONTHLY RETURN OF "A." AND "M.O." INSTRUMENTS.

October, 1902.

—	Barometers.	Aneroids.	Thermometers. Ordinary.	Maximum.	Minimum.	Solar Radiation.	Terr. Radiation.	Screens.	Hydrometers.	Rain Gauges.	Anemometers.	Storm Cones.	Sunshine Recorders.	Glass Spheres.	Miscellaneous.
"A" ACCOUNT.															
Dr.															
On charge, 1st Oct., 1902	76	151	258	113	117	—	—	44	37	2	—	—	—	—	
Received since	11	34	17	25	24	—	—	10	—	—	—	—	—	—	
	87	185	275	138	141	—	—	54	37	2	—	—	—	—	
Cr.															
Sent out during month...	36	48	87	22	11	—	—	10	—	—	—	—	—	—	
On charge, 1st Nov., 1902	51	137	188	116	130	—	—	44	37	2	—	—	—	—	
"M.O." ACCOUNT.															
Dr.															
On charge, 1st Oct., 1902	26	2	11	10	6	2	9	7	53	8	1	8	2	2	
Received since	18	—	18	—	—	—	—	—	6	—	—	—	—	—	
	44	2	29	10	6	2	9	7	59	8	1	8	2	2	1 Barograph, 1 Hygrograph, 1 Thermograph.
Cr.															
Sent out during month...	21	—	16	1	2	—	3	7	42	—	—	—	—	—	
On charge, 1st Nov., 1902	23	2	13	9.	4	2	6	—	17	8	1	8	2	2	1 Barograph, 1 Hygrograph, 1 Thermograph.

4th November, 1902.

R. F. WALLACE.

STATISTICAL AND LIBRARY BRANCH.

1. Issue of Publications :—

Daily and weekly publications regularly issued.

Monthly Summary of the "Weekly Weather Report" for August, 1902, received and issued.

Pilot Charts for November, 1902, received, and 331 copies issued; also 286 copies of charts for previous months issued to Captains of ships and others.

Presentation copies of publications, 56 in all, issued to Captains and Officers of ships and others.

2. Statistical and Station Work :—

Tables for the weekly issues of the "Weekly Weather Report," prepared to date, and carried through the press.

Tables, and Maps Nos. 1, 3 and 4 for the Monthly Summary of the "Weekly Weather Report" for August, 1902, completed; and those for September, 1902, prepared and both carried through the press.

Ten-day Means of Observations at five British Stations prepared and regularly supplied to Dr. Neumayer of Hamburg.

Results of Daily Observations of Temperature and Rainfall, prepared and regularly supplied to the Registrars General for their Weekly Returns, namely, for—

England and Wales from ... ... 14 Stations.
Ireland from ... ... 6 Stations.

Monthly and Quarterly Results of Complete Observations prepared and supplied to the Registrars General for their Quarterly Returns, namely, for—

England and Wales from ... ... 28 Stations.
Ireland from ... ... 8 Stations.

Quarterly Summary of the "Weekly Weather Report."—Proof of the tables for the second quarter of 1902 revised and passed for press, and tables for the third quarter prepared and also passed for press.

"Returns from Stations of the Second Order" for 1899 proceeded with.

Inspectors' reports collated and prepared for "Minutes," with tables giving results of comparisons of barometers and thermometers.

Library :—

Accessions to Library received, press-marked and catalogued on cards.

Fifty volumes of publications prepared and listed for binding.

Inquiries :—

Fifty-seven inquiries were dealt with during October. Seven of these were by letter, but in 50 cases personal application was made. In 13 cases of personal application payment was made for the preparation of the information supplied.

Mr. Hodgson, on behalf of Sir Norman Lockyer and Dr. W. J. S. Lockyer, was engaged during part of the month extracting data respecting pressure at various Foreign and Colonial Stations.

JOHN A. CURTIS.

458. *Accounts* (1). *Payments for Overtime Work.*—The Secretary reported that the additional allowance for overtime work made under Minute 104 (3) had been computed at one half of the ordinary hourly rate as in the Telegraphic Branch, and that he proposed, unless otherwise instructed, to compute such allowances for classified clerks, at a similar rate in future.

Approved.

(2). *Audit.*—Reported—That the cash accounts for the quarter ended the 30th June last had been this day examined by Prof. Darwin and Dr. Buchan, and would be sent in due course to the Treasury for the Audit Office. The receipts from the 1st April last, when there was a balance of £2,464 19*s.* 7*d.*, were £4,249 10*s.* 3*d.* against £3,938 3*s.* 9*d.* in the corresponding period of the preceding financial year. The payments were £5,024 7*s.* 3*d.* against £4,931 0*s.* 4*d.* during the same period in the previous year. The balance in hand and at the bank on the 30th June, 1902, amounted to £1,690 2*s.* 7*d.*, and at the same date in 1901 to £2,129 12*s.* 6*d.*

(3). Submitted—The following statement of accounts :—

	£	*s.*	*d.*
Cash balance on 21st October	5,132	7	1
Receipts from 22nd October to 4th November	57	18	4
	5,190	5	5
Cheques drawn from 22nd October to 4th Nov.	1,024	5	0
Cash balance on 4th November	£4,166	0	5

459 Submitted—The following list of publications which had been received since the last meeting :—

Batavia, Kon. Magnetisch en Meteorologisch Observatorium.—Uitkomsten von meteorologische waarnemingen in Nederlandsch-Indië. 1899.

—— *Royal Magnetical and Meteorological Observatory.*—Observations. Vol. 23. 1900.

Bemmelen, W. van.—Total solar eclipse, May 18, 1901. Magnetic observations at Batavia and Karang Sago (Sumatra).

Börnstein, R.—Die Verlegung des wettertelegraphischen Dienstes auf eine frühere Stunde. 2. Mittheil.

Calcutta, Meteorological Office, India.—Report on the administration of the Meteorological Department of the Government of India in 1901-2.

Chemnitz, K. Sächsisches Meteorologisches Institut.—Decaden-Monatsberichte. 1901, Jahrg. 4.

Cullum, J. E.—Report of absolute magnetic observations at the Valencia Observatory (Cahirciveen, co. Kerry), 1899, 1900, and 1901.

Falmouth, Royal Cornwall Polytechnic Society.—Sixty-ninth Annual Report. 1901.

Harvey, C. W.—The gale of October 14, 1881, and its effects in Hertfordshire.

Harvey, C. W.—Summary of meteorological observations of temperature and rainfall taken at Throcking Rectory, Buntingford, Herts, 1880-1899.

Lockyer, Sir Norman, and Lockyer, W. J. S.—On some phenomena which suggest a short period of solar and meteorological changes.

London, Admiralty, Hydrographic Department.—Eastern Archipelago, Part 1. Eastern part. 2nd ed., 1902.

[*London, Meteorological Office*].—Temperature tables for the British Islands. Supplement.

Nassau, Bahamas.—Meteorological observations. 1901.

**Toaldo, Joseph.*—La meteorologia applicata all' agricoltura. (1775).

Valentin, J.—Der Staubfall vom 9. bis 12. März, 1901.

Vienna, K. K. hydrographischer Dienst in Osterreich.—Wochenberichte über die Schneebeobachtungen im österreichischen Elbegebiete und im böhmischen Donau- und Odergebiete für den Winter. 1901-2.

—— —— —— Wochenberichte über die Schneebeobachtungen im österreichischen Rhein-, Donau-, Oder-, und Adriagebiete für den Winter. 1901-2.

—— —— —— Wochenberichte über die Schneebeobachtungen im österreichischen Weichsel-, Dniestr-, Styr-, Pruth-, und Serethgebiete für die Zeit vom 1. December, 1901, bis 22 März, 1902.

Washington, Department of Agriculture, Office of Experiment Stations.—Bulletin No. 106. Results of investigations on the Rothamsted soils, being the lectures delivered under the provisions of the Lawes Agricultural Trust, by Bernard Dyer.

—— —— *Smithsonian Institution.*—Smithsonian miscellaneous collections.

63, *Victoria Street, S.W., 19th November*, 1902.

PRESENT:

SIR R. STRACHEY, IN THE CHAIR.

PROFESSOR DARWIN. | THE HYDROGRAPHER.

MR. SHAW (*Secretary*).

460. The Minutes of the last meeting (5th November) were read and confirmed.

461. *National Physical Laboratory* (Minutes 446, 449).—The following letter to the Royal Society, with regard to Professor Schuster's letter to the Chairman (M.O. 2,076), was approved (P.C. 2,692) :—

Enclosure.

M.O. 2,076.

Meteorological Office,
19th November, 1902.

SIR,

I AM directed by the Meteorological Council to bring to the notice of the President and Council of the Royal Society a letter addressed to their Chairman by Prof. Schuster, one of the Members of this Council, which was brought before the General Meeting of the Council, held on the 5th November.

I enclose a copy of this letter, and am to say that the Directors and Council concur in the views expressed by Prof. Schuster as to the maintenance of the connexion which has long existed between the ordinary work of the Meteorological Office, as conducted at Kew, and the investigation of the phenomena of atmospherical electricity and terrestrial magnetism, and their connexion with meteorological phenomena generally.

They further agree in the opinion that the contemplated establishment of a new magnetical observatory under the direction of the National Physical Laboratory, to replace that now existing at Kew, renders it most important that the organisation of this new observatory and its relations with the Meteorological Office, as well as the future position of the Kew Observatory, should be carefully considered and discussed in communication with the Meteorological Council.

It appears to be the more necessary that this should be done as the continuance of the observations hitherto made at Kew was one of the recognised conditions of the understanding by which £400 is contributed annually from the Parliamentary Meteorological Grant to the funds of the National Physical Laboratory.

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* Purchased.

The contemplated early appointment by the Treasury of a Committee, relative to which the President of the Royal Society was addressed by the Chairman of the Meteorological Council on the 5th instant, and which will, no doubt, fully consider the position of the Meteorological Council, and the objects to which the funds derived from the Parliamentary Grant are applied, appears to supply an additional reason for the subject of Prof. Schuster's letter receiving the early attention of the President and Council of the Royal Society; and I am to express the hope that, for the reasons that have been stated, it may be favourably considered by them.

I am, &c.,
W. N. SHAW,
Secretary.

The Secretary, Royal Society.

462. *Observatories.*—(1) *Falmouth: Thermograph Screen.*—Read—Letters 2,903 and 2,131 from Mr. W. L. Fox, also P.C. 2,637, and Mr. Baker's report (M.O. 2,129) respecting the necessity for replacing the thermograph screen at Falmouth, which had become dilapidated and required immediate renewal.

The expenditure necessary to renew the screen, estimated at about £6 10*s.*, was authorised.

(2) *Fortwilliam.*—Read—Letter 1,974 from Mr. T. W. Baker reporting that the spare thermograph tube sent to replace the one taken into use on 18th July, 1900, had, through inadvertence, been sent back again to Kew in its original packing-case, and upon inquiry being made had been found broken.

463. *Anemograph Stations.*—(1) *Fleetwood* (Minute 415).—Read—Letter 2,136 from the Clerk to the Fleetwood Urban District Council stating that the District Council had decided that the payment of £10 per annum will only be accepted as rent for the use of a portion of the New Pavilion, without reference to the previous correspondence of 1886 concerning the arrangement for the care of the anemometer.

The Secretary was directed to inform the Urban District Council that the Council decline to entertain the proposal for the payment of an annual rent; and he was authorised to make arrangements for removing the anemometer if necessary.

(2) *Shoeburyness* (Minute 434).—The Secretary reported that he had visited the site of the anemograph at Shoeburyness on 12th November and found the exposure admirable and the anemometer in satisfactory working order. The supplementary apparatus consisted of a thermometer screen with the usual equipment, a Negretti thermograph, two aneroidographs, and two rain gauges, one 5 in. and the other 8 in. in diameter. The 5 in. gauge had its rim about a foot above standard height and the 8 in. gauge about four inches below. The enclosure containing the screen and rain gauges had a gravel surface.

Major Lowe expressed his willingness to send any of the observations or records obtained at the station for the use of the Office if required.

464. *Kite Experiments* (Minutes 287, 314).—(1) The payment of £7 15*s.* 1*d.*, the expenses of the base station at Crinan Harbour during the experiments with kites at Crinan and on the neighbouring lochs, was authorised.

(2) The Secretary was authorised to carry out the tabulation of the curves obtained with the meteorograph during the experiments referred to.

465. *Publications: Pilot Charts.*—Read—The following memorandum from the Marine Superintendent:—

19th November, 1902.

The present supply of official copies of the Pilot Chart is now insufficient to admit of a copy of each issue being sent to each observer for this Office in the Mercantile Marine as promised.

Permission to requisition 200 additional official copies monthly is desired. The supply for some time past has been 400 copies.

466. *Logs.*—Seven received—two excellent.

467. *Accounts*—(1) Submitted—The following Statement of Accounts for the six months to 30th September, 1902 :—

Receipts.	£ s. d.	£ s. d.	Payments.	£ s. d.	£ s. d.
Balance from year 1901–1902	—	2,464 19 7	ADMINISTRATION :		
Proportion of vote ...	—	7,000 0 0	Secretary	300 0 0	
Repayment of expenses charged under—			Salaries and wages ...	534 9 4	
(1.) Incidental expenses	21 9 1		Rent, fuel, and lighting	363 0 1	
(2.) Observatories ...	9 6 9		Incidental and contingent expenses ...	139 17 4	
(3.) Telegraphic Reports	2 0 0		Furniture and fittings	305 10 5	
		32 15 10			1,642 17 2
SUPPLY OF INFORMATION :			SPECIAL RESEARCHES :		
Weather Forecasts, Reports, &c. ...	387 10 10		Salaries and other charges	—	378 3 6
Telegrams sent abroad	421 1 9		LAND METEOROLOGY :		
		808 12 7	Observatories and stations, including remuneration of observers	1,055 9 4	
SUPPLY OF INSTRUMENTS, &c. :			Salaries :— Discussion and reduction of observations, &c. ...	911 12 3	
Repayment of cost of M.O. instruments purchased by observers	61 15 8				1,967 1 7
Repayment of cost of other commissions...	14 2 0		WEATHER INFORMATION AND FORECASTS :		
		75 17 8	Telegraphic reports and storm warnings, remuneration of observers, &c.	1,622 3 3	
CHARGES FOR COMMISSION :			Salaries:—Preparation and issue of reports and forecasts ...	756 7 10	
On supply of instruments, &c.	—	3 10 0			2,378 11 1
			OCEAN METEOROLOGY :		
SUPERANNUATION ACCOUNT :			Salaries :— Discussion and reduction of observations... ...	696 4 10	
Annuity	70 9 5		Expenses incidental to the supply of instruments :—		
Interest on Investment	23 3 2		Proportion for care and issue of instruments	67 10 0	
		93 12 7	Royal Navy ...	223 5 8	
			Mercantile Marine...	200 7 5	
					1,187 7 11
			Miscellaneous commissions executed for Colonial and Foreign institutions, &c. ...	—	164 3 7
			SUPERANNUATION :		
			Pensions and allowances...	342 9 5	
			Invested	750 0 0	
					1,092 9 5
			BALANCE :		
			Cash at Bank... ...	1,564 17 5	
			„ at Office ...	53 16 7	
			Advances for travelling expenses ...	50 0 0	
					1,668 14 0
		£10,479 8 3			£10,479 8 3

Liabilities.	£ s. d.	Assets.	£ s. d.
To sundry creditors	1,183 9 4	By cash at Bank and at Office ...	1,618 14 0
„ balance	1,750 3 10	„ H.M. Exchequer	650 0 0
		„ sundry debtors	664 19 2
	£2,933 13 2		£2,933 13 2

NOTE.—On September 30th the amount of 2½ per cent. Consols held by the Council for the provision of superannuation annuities was £2,363 6*s.* 5*d.*

(2) Submitted—The following Statement of Accounts :—

	£	s.	d.
Cash balance on 4th November	4,166	0	5
Receipts from 5th to 18th November	24	17	8
	4,190	18	1
Cheques drawn from 5th to 18th November ...	84	15	11
Cash balance on 18th November	£4,106	2	2

468. *Storm Warnings :—*

Warnings Issued.—Signals hoisted on 10 days ; total number of districts warned, 54. In 18 districts warnings justified by subsequent gales (force 8 and upwards) ; in 19 districts by strong winds (force 6 or 7) ; in 17 districts not required.

Gales experienced for which no warnings were issued.—None.

FREDC. GASTER.

469. Submitted—The following list of publications, which had been received since the last meeting :—

Bangalore, Mysore Government Meteorological Department.—Report on rainfall registration in Mysore for 1901. By J. Cook.

Bordeaux, Société d'Océanographie du Golfe de Gascogne.—La donation Guestier-Cruse et l'observatoire de météorologie maritime, par Charles Bénard.

—— —— Golfe de Gascogne. Tracés des vents successifs (méthode Hautreux). 1902, October.

Colombo, Surveyor General's Office.—Report on the meteorology of Ceylon for 1901.

Georgetown, Demerara.—Meteorological observations taken at the Botanic Gardens, Georgetown. April, 1901, to March, 1902.

Hellmann, G.—Regenkarte der Provinzen Schleswig-Holstein und Hannover, sowie von Oldenburg, Braunschweig, Hamburg, Bremen u. Lübeck.

Honolulu, Weather Bureau.—The rainfall of the Hawaiian Islands. C. J. Lyons, Director of Weather Bureau.

Jansson, M. et Westman, J.—Quelques recherches sur la couverture de neige.

Kiel und Helgoland, Kommission zur wissenschaftlichen Untersuchung der Deutschen Meere in Kiel und der Biologischen Anstalt, auf Helgoland.—Wissenschaftliche Meeresuntersuchung. Neue Folge. 6. Band. Abtheilung Kiel.

Ottawa, Department of Marine and Fisheries.—Report of the Meteorological Service of Canada. By R. F. Stupart. 1899, 1900. 2 vols.

St. Petersburg, Meteorological Section of the Central Hydrographical Committee.—Summary of hydro-meteorological observations. Part 3, 1899. Supplement to Part 24 of the Hydr. Journ.

Sydney Observatory.—Sydney weather chart. 1900, January to December. 12 vols.

—— *Royal Society of New South Wales.*—Journal and proceedings. Vol. 35, 1901.

Villa Colón, Observatorio del Colegio Pio de Villa Colón, Monte Video.—El año meteorológico, 1900–1901. Por el P. Juan de Dios Moratorio.

63, *Victoria Street, S.W., 3rd December*, 1902.

PRESENT:

SIR R. STRACHEY (IN THE CHAIR).

MR. BUCHAN.	THE HYDROGRAPHER.
PROFESSOR DARWIN.	MR. SHAW (*Secretary*).

470. The Minutes of the last meeting (19th November) were read and confirmed.

471. *Ben Nevis Observatories.*—Read—Letter 2,174 from Sir Arthur Mitchell intimating that "the Directors think that your letter to me of 13th August, 1902, indicates that the Council will be ready to give their grant of £250 for the second, as well as for the first, of these two years" (ending October, 1902). (Minute 406.)

The Secretary was directed to reply that the effect of his letter of the 13th August was that until the report of the proposed committee was received no action would be taken by the Council in withholding the grant that had hitherto been given.

472. *Storm Signals.*—Read—The following letter and enclosure (2,245):—

M.O. 2,245.

Glenbeg, Dungarvan,
25th November, 1902.

DEAR SIR,

AT the suggestion of the Shipwrecked Mariners and Fishermen's Royal Benevolent Society, I beg to enclose you copy letter of mine to the Editor of the "Irish Times."

I take a very great interest in the fishing population of this district, and believe that should the suggestions contained in my letter be carried out, a very great boon will result to all persons connected with the sea on the coast of the United Kingdom.

I look upon it as a very great loss to the community that the valuable information at the disposal of the Meteorological Office is not made public to the persons most interested in the matter.

I would therefore beg consideration in this matter by the heads of your department.

Yours faithfully,
J. T. HUDSON.

The Secretary, Meteorological Office,
63, Victoria Street, London, S.W.

(Copy.)

To the Editor of the "Irish Times."

SIR,

ON last evening I happened to hear of the following telegram from the Meteorological Office:—"Another disturbance approaching London."

The evening was fine, and, to the ordinary eye there was no indication of approaching storm. This morning a strong gale is blowing. This important information was not, so far as I know, made public or in any way conveyed to the fishing population of the district. Publication might, or might not, have been the means of saving life and property.

What I would suggest is, now that Coastguard stations are in telephonic communication with local telegraph offices, that the Admiralty will, in the interest of humanity, direct that storm signals shall be hoisted at all Coastguard stations on receipt of message from the Meteorological Office.

I would also submit that the present storm signals are not the most desirable for definition at long distance, and that signals should be so arranged that not only the direction of the wind, but probable veering point, shall be signalled.

The experienced sailor calculates on the probable veering point of the wind when seeking shelter. But this knowledge is not shared by a large number of men often in perilous positions on our coasts.

Yours, &c,
J. T. HUDSON.

Glenbeg, Dungarvan,
13th November, 1902.

The Secretary was directed to ascertain from the storm signal station at Dungarvan whether the storm warning message was duly received on 12th November, and whether the signals were hoisted.

473. *London Fog Inquiry* (Minute 432).—The Secretary reported (1) that the text of Captain Carpenter's report had been revised, and some of the plates received from the lithographers.

(2) That for the purpose of making experiments with regard to the investigation of the vertical distribution of temperature in connexion with the inquiry, Mr. P. Y. Alexander, of Bath, had offered to lend a balloon about 20 feet in diameter, with net, &c., which, when half filled with coal gas and then blown out with air, would have a lifting capacity of 80 lbs., and could be used as a captive balloon if a suitable site for experiments could be found; that Mr. Alexander had also offered to lend a meteorograph for use with the balloon.

The Secretary was directed to thank Mr. Alexander for his generous offer, and to report upon the details of possible experiments with the apparatus.

474. *Balloon and Kite Observations: International Co-operation* (Minute 409).—Read—The following letter (2,181):—

M.O. 2,181.

Foreign Office,
18th November, 1902.

SIR,

I AM directed by the Secretary of State for Foreign Affairs to transmit to you, to be laid before the Council, copy of a note from the German Chargé d'Affaires, enclosing a copy of the resolutions passed by the International Committee for Scientific Aeronautics at a meeting recently held in Berlin.

I am, &c.,
T. H. SANDERSON.

The Secretary,
Meteorological Office.

The copy of the resolutions enclosed with the letter is, with some modification of the first resolution, the same as that from which the translations printed in Minute 409 were made. The following note is added:—

[Translation.]

"*Scheme of distribution of the sum of* 6,000 *marks asked for for the purposes of publication.*

"For the twelve sections appearing (one) in each month—containing the observations of the "monthly simultaneous ascents, together with Charts, Curves, and Drawings—

	Marks.
"Cost per section 250 marks—12 × 250	3,000
"For computations and assistance	3,000
	6,000

"It is desirable that the relative adjustment of the two items should be expressly allowed."

It was resolved to address the following letter to the Royal Society (P.C. 2880):—

M.O. 2,181.

4th December, 1902.

SIR,

I AM directed by the Meteorological Council to inform you that they have received from the Secretary of State for Foreign Affairs a copy of a note from the German Chargé d'Affaires, conveying resolutions passed by the International Committee for Scientific Aeronautics, as to the importance of observations upon the upper air by means of balloons and kites in the British Isles and India, and as to the desirability of organising the publication of results of balloon and kite observations in various countries, on an international basis.

The Council have already received notification of these resolutions from Major Trollope, Instructor in Ballooning at Aldershot, and from Professor Hergesell, the Chairman of the Aeronautical Committee, and, informally, from the Secretary of the Royal Society, and have passed a resolution to the effect that though they have no means for taking part in the international investigation of the upper air, they were willing to render any assistance in the consideration of the question whether such an investigation is practicable in the British Isles, and if so what steps would be necessary for carrying it out.

The Council are fully cognisant of the scientific importance of the investigation of the upper air, and of the exceptional interest which attaches to such observations in the British Isles and in India, on account of the geographical position of these countries with regard to some of the most characteristic meteorological phenomena of the globe; at the same time they are equally aware of the exceptional difficulties attaching to such experiments in this country. The question of international organisation for publication of results, on the model of the Geodetic Commission, they regard as a separate question.

As these questions have now been raised with the Office directly by the Secretary of State for Foreign Affairs, the Council desire to ascertain whether there is any prospect of the United Kingdom being able to take part in this international undertaking, in order that the German Chargé d'Affaires may be duly informed. The Council know of no means of providing the necessary funds except by an appeal to the Treasury, or to the Government Grant Committee, and I am to ask whether the President and Council of the Royal Society are willing to co-operate with the Council in an application to H.M. Treasury with the object of initiating an investigation in the British Isles as suggested by the International Aeronautical Committee.

So far as the Council are at present able to form an estimate, they are of opinion that the sum of about £500 per annum during the continuation of the experiments, with an allowance for initial expenses, would enable them to take an effective part in the international investigation. They are willing to prepare a more definite estimate if it should be desired.

I am, &c.,
W. N. SHAW,
Secretary.

The Secretary,
Royal Society, Burlington House, W.

475. *Telegrams from the Azores* (Minute 451).—The Secretary reported that from 1st December a telegraphic weather report from Horta, Fayal, had been delivered at the Office by messenger from the Commercial Cable Company at about 8.30 a.m. each day, and that the telegram from Ponta Delgada, San Miguel, had also arrived later in the day, presumably as a survival of the old arrangement.

He was directed to write to the Commercial Cable Company expressing the thanks of the Council for the new service.

476. *Colonial Observations.*—Reported—A request from Prof. Hann, forwarded by Mr. Scott, for copies of the summaries of observations in Cyprus, and of the returns from Wei hai Wei, published in the Reports of the Army Medical Department, 1899, 1900.

The Secretary reported—(1) That the Summaries of the Cyprus observations had been published by Prof. Hann to the end of 1891. (Meteorologische Zeitschrift, Vol. XI., 1894.)

The printed returns had been received up to 1898, and those for 1899, 1900, and 1901 had been asked for.

The returns on Form 19 had been received to the end of September, 1902.

In March, 1888, the returns for the six stations for the years 1883–6 were sent to Dr. Hann, and returned to the Office. In 1893 duplicates of the printed summaries were furnished to him, with an intimation that they need not be returned.

(2) That as regards observations at Wei Hai Wei, daily records of temperature, pressure, and rainfall from 10th August, 1898, to 9th August, 1899, with summary of temperature and rainfall to 9th August, 1900, were printed as an Appendix to the Annual Report of the Army Medical Department for the year 1899. The observations were continued in the Report for the following year, and concluded with August, 1901, when the station was abandoned by the Army Medical Department and the observations were discontinued.

With a view to complying with Dr. Hann's request, a copy of the Reports of the Department for the years 1899 and 1900 had been obtained.

The Secretary was authorised to send to Dr. Hann the information asked for on his behalf.

477. *Returns for the Registrars-General.*—Submitted—The following memorandum in accordance with the direction of Minute 439 (iv.) :—

The preparation of the weekly and quarterly returns for the Registrars-General, as far as carried out in the M.O., occupies the time of the staff as shown below :—

Registrar-General for Ireland :—

Weekly report—Half-an-hour per week for one clerk.

Quarterly report—Two days per quarter for one clerk.

Cost at 2*s.* 6*d.* per hour—£11 5*s.*

Registrar-General for England and Wales :—

Weekly report—Two and a-half hours per week for one clerk.

Quarterly report—Six weeks per quarter for one clerk.

Cost at 2*s.* 6*d.* per hour—£148 5*s.*

For the whole year this works out at about two-thirds of the effective time of one clerk (say £100). When, however, the revised form of publication comes into use the time required for the preparation of the tables will not occupy more than half the time of one person (say £75).

Submitted also the following list of stations to be suggested to the Registrar-General as stations for which Meteorological Summaries should be included in his quarterly report :—

NOTES.—London is treated as a separate district.

In selecting the stations an attempt has been made to represent in the several districts the effect of height above sea level, proximity to the sea, and urban or rural conditions of exposure.

R.G. signifies that the station formed one of Mr. Glaisher's system for reporting to the Registrar-General.

O. signifies that the station is maintained by a local authority or public institution.

P. „ „ „ private person.

LONDON.

Official or Private.	Station.	Character.	Height above M.S.L.
			Feet.
R.G. O.	Greenwich	Urban	159
O.	Kew	Suburban	18
R.G. P.	Camden Square	Urban	123
O.	Brixton	Urban	77
O.	Westminster	Urban	76
R.G. P.	Croydon	Urban	185
R.G. P.	Barnet	Suburban	212

ENGLAND, E.

Official or Private.	Station.	Character.	Height above M.S.L.
			Feet.
O.	Yarmouth (or Lowestoft)	Coast, Urban	10 (84)
O.	Hollesley Bay	Coast, Rural	38
O.	Dunmow	Inland, High Urban	300
R.G. O.	Cambridge	Inland, Low Urban	83
R.G. P.	Norwich	Inland, Urban	?42
P.	Bennington	Rural, High	407
P.	Hillington	Rural, Low	88
	And a Station in the Fens, if possible.		

ENGLAND, N.E.

Official or Private.	Station.	Character.	Height above M.S.L.
			Feet.
O.	Shields	Coast, Urban	99
O.	Spurn Head	Coast, Rural	26
O.	Durham	Urban, High	336
O.	York	Urban, Low	56
R.G. O.	Hull	Urban, Low	6
O.	Cockle Park	Rural, High	324
P.	Tealby	Rural, Middle	251

Midland Counties.

Official or Private.	Station.	Character.	Height above M.S.L.
			Feet.
O.	Sheffield	Urban, High	534
O.	Wakefield	Urban, Low	56
O.	Birmingham	Urban, High	534
R.G. O.	Coventry	Urban, Middle	300
P.	Buxton	Suburban, High	987
P.	Cheltenham	Suburban, Middle	184
R.G. O.	Oxford	Suburban, Middle	208
P.	Churchstoke	Rural, High	538
P.	Stokesay	Rural, Middle	370
P.	Berkhamsted	Rural, High	400
P.	Belvoir Castle	Rural, Middle	259

England, N.W.

Official or Private.	Station.	Character.	Height above M.S.L.
			Feet.
R.G. O.	Llandudno	Coast, Urban	72
O.	Aspatria (or Grange ?)	Coast, Rural	250
R.G. O.	Halifax	Inland, High Urban	625
O.	Manchester	Inland, Low Urban	190
P.	Aysgarth	Rural, High	646
R.G. O.	Stonyhurst	Rural, Middle	375
	And Barmouth or Llangollen, if possible.		

England, S.W.

Official or Private.	Station.	Character.	Height above M.S.L.
			Feet.
R.G. O.	Plymouth	Coast, Urban	116
O.	St. Ann's Head (or Woolacombe)	Coast, Rural	150 (59)
R.G. O.	Bristol	Urban, Middle	230
R.G. O.	Truro	Urban, Low	43
R.G. P.	Llangammarch Wells	Rural, High	585
R.G. O.	Barnstaple	Suburban, Low	43
R.G. O.	Bath	Suburban, Low	70

England, S.

Official or Private.	Station.	Character.	Height above M.S.L.
			Feet.
O.	Southampton	Coast, Urban	78
R.G. O.	Portsmouth	Coast, Urban	18
R.G. O.	Ventnor	Coast, Suburban	80
O.	Portland Bill	Coast, Rural	177
R.G. O.	Brighton	Coast, Urban	65
O.	Dungeness (or Eastbourne)	Coast, Rural	26 (39)
R.G. P.	Salisbury	Inland, Rural	186
P.	Bramley	Inland, Rural	148
P.	Parkstone	Coast, Suburban	197
	(Canterbury, Chatham, or Maidstone ?)		39, 136

ENGLISH CHANNEL.

Official or Private.	Station.	Character.	Height above M.S.L.
			Feet.
O.	Scilly	Coast, Rural	65
O.	Jersey	Coast, Suburban ...	25
R.G. P.	Guernsey	Coast, Urban	275

The selection of stations was provisionally approved, and the Secretary was directed to proceed with the preparation of the quarterly report in the ensuing year.

478. *Publications: Hourly Means.*—The volume of Hourly Means for 1899 was submitted and approved.

It was resolved that a suggestion to discontinue the preparation of five daily means and to issue an annual volume of hourly readings at Aberdeen, Kew, Falmouth, and Valencia (leaving the Fortwilliam observations to be published in connexion with the Ben Nevis readings) be submitted for consideration at a future meeting.

479. *Publications: Presentation Copies.*—The presentation of copies of publications was authorised as follows:—

(1) The Daily Weather Report, at the suggestion of Mr. Bird (M.O. 2,198), to Messrs. Curry and Paxton, opticians, 195, Great Portland Street, for exhibition.

(2) Pilot Charts to the Liverpool Underwriters' Association (M.O. 2,262) and to Mr. Flagg, the Marine School, South Shields (M.O. 2,183).

(3) The Weekly Weather Report and annual publications to the Solar Physics Observatory, South Kensington, in exchange for publications.

(4) Annual publications to the Central Observatory of Belgrade in exchange for publications (M.O. 2,188).

480. *Office Staff: Messengers.*—The Secretary reported that, in consequence of certain irregularities with regard to the distribution of the copies of the Daily Weather Report for railway stations, Commissionaire J. Taylor had resigned, and that he proposed to substitute two boys and to provide them with suitable uniforms.

Approved.

481. *Volcanic Dust from Barbados*, 1812.—Reported—The presentation by Mr. Harries of a specimen of dust which fell in Barbados on 1st May, 1812—known locally as May dust—arising from an eruption of the Soufrière, St. Vincent (*see* Minute 347), together with copies of analyses by Professor P. Carmody of samples of dust from the Soufrière and Mont Pelée, due to eruptions in the current year (M.O. 2305).

482. *Logs.*—Seven received, two excellent (Captain J. C. Robinson and Captain H. Walker).

483. *Storm Warnings:*—

Signals hoisted on nine days; the total number of districts warned, 70.
In 28 districts warnings justified by subsequent gales (force 8 and upwards); in 25 districts by strong winds (forces 7 or 6); in 17 districts not required.

Gales experienced, for which no warnings were issued.—None.

484. *Forecasts.*—Issued at 8.30 p.m. daily during the month of November, 1902 :—

The letters used have the following signification :—
a = complete success. | c = partial failure.
b = partial (*i.e.*, more than half) success. | d = total failure.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success. a + b.
Scotland, N.	a	57	73	65	94
"	b	30	27	29	
"	c	13	0	6	
"	d	0	0	0	
Scotland, E.	a	47	73	60	96
"	b	47	24	36	
"	c	6	3	4	
"	d	0	0	0	
England, N.E.	a	40	60	50	92
"	b	47	37	42	
"	c	10	3	7	
"	d	3	0	1	
England, E.	a	47	43	45	89
"	b	37	50	44	
"	c	13	7	10	
"	d	3	0	1	
Midland Counties	a	47	47	47	89
"	b	43	40	42	
"	c	7	13	10	
"	d	3	0	1	
England, S.	a	47	50	49	87
"	b	37	40	38	
"	c	13	10	12	
"	d	3	0	1	
Scotland, W.	a	40	57	49	89
"	b	40	40	40	
"	c	20	3	11	
"	d	0	0	0	
England, N.W.	a	40	64	52	90
"	b	43	33	38	
"	c	17	3	10	
"	d	0	0	0	
England, S.W.	a	44	47	46	86
"	b	33	47	40	
"	c	20	6	13	
"	d	3	0	1	
Ireland, N.	a	50	60	55	86
"	b	24	37	31	
"	c	23	3	13	
"	d	3	0	1	
Ireland, S.	a	30	54	42	77
"	b	37	33	35	
"	c	30	13	22	
"	d	3	0	1	
Summary.					
British Islands	a	44	57	51	88
"	b	38	37	37	
"	c	16	6	11	
"	d	2	0	1	

485. *Inspections.*—Additional reports :—

NORMAL CLIMATOLOGICAL STATION.

(See Minutes, page 64.)

Cromer, November 10th.—The station occupies a very appropriate site at the top of a low hill, about half a mile to the west of Cromer Church. The horizon is hidden within the southern semi-circle by hills of about the same height ; for the northern semi-circle the horizon is free to the sea. Mr. Archer is a very competent and trustworthy observer, and has carried out all the arrangements for the station, including the adjustment of the sun recorder, with skill and good judgment. The rain gauge is perhaps rather close to the hut erected for the use of the observer in the corner of the enclosure, but I did not take full particulars. The instruments were all in good order ; there was a little spirit at the top of the minimum and grass minimum thermometers.

W. N. S.

STATION CONTRIBUTING TO THE RETURNS ISSUED BY THE REGISTRAR-GENERAL FOR ENGLAND.

(See Minutes, page 71.)

Coventry, November 18th.—This is a station furnishing observations to the Registrar-General. It is under the direction of Dr. E. Hugh Snell, the Medical Officer of Health for the city. The barometer is a " Fortin," and is hung in Dr. Snell's office, but the outdoor instruments are placed in the grounds of the City Hospital, about three-quarters of a mile distant, where, except for sunshine, they have an excellent exposure.

The outfit of instruments is complete, and includes solar, grass, and earth thermometers, a Negretti's self-registering rain gauge, and a Jordan sunshine recorder, in addition to the usual thermometers and rain gauge. The instruments themselves are satisfactory, and the thermometer screen though not of the standard pattern is yet on the Stevenson principle and may be accepted.

The observations will correctly represent the climate of Coventry.

Dr. Snell is much interested in the work and expressed himself as willing to do all in his power to meet the Office requirements.

J. A. C.

OTHER CLIMATOLOGICAL STATIONS.

(See Minutes, page 69.)

Chatsworth, November 19th.—The instruments in use at this station comprise a Richard barograph and thermograph, a rain gauge and sundry thermometers, exposed near the house and in the grounds.

The pen of the barograph was defective, and I therefore removed it and fitted a new one which gives a much better trace.

The thermograph is exposed on a window ledge outside the north front of the house ; it was working well except that the clock usually stops on Tuesdays. If after levelling the instrument this defect still continues, I recommend the instrument be sent to London for repair.

The rain gauge is 8 ins. in diameter and is placed on a post near the Italian garden, its rim being 5 ft. 8 ins. above the ground. The records are continuous since 1861. The measuring glass was correct.

The daily maximum and minimum temperatures are recorded for the information of the Duke of Devonshire, and are by him forwarded to the Office, together with the records of rainfall and wind direction and daily remarks on the weather.

I found that the readings entered as maxima were really noon readings of the air temperature, and that the readings both of maximum and minimum had been wrongly corrected to the extent of 1·5°.

The instruments themselves are reliable. On testing them in water with my standard I found the maximum read 0·5° too high and the minimum read 0·5° too low. They are not, however, properly exposed, being placed on a board affixed to a post at 2 ft. 6 ins. above the ground. There is no proper thermometer screen in use.

There is a large size " Six's " thermometer exposed outside the Duke's study window, and another on a north wall in the kitchen garden, besides several garden thermometers, but the readings of these instruments are not recorded.

A mercurial barometer hangs near the barograph but is not used.

I recommend that the Duke be asked—(*a*) To provide a Stevenson screen so that the Chatsworth temperatures may be taken under standard conditions, and to direct that the daily maximum and minimum in the kitchen garden be recorded, either by the " Six's " thermometer already there, or preferably from other instruments exposed in a Stevenson screen.

(*b*) To direct that the mercurial barometer be read daily, and its readings entered at the end of each week on the barograph curve.

(*c*) To allow the Office to have a copy of the monthly rainfall amounts from 1861.

J. A. C.

A.—OBSERVATORIES.

(See Minutes, page 74.)

Falmouth, November 11th to 20th.—Here all the meteorological instruments were found working satisfactorily, and the photography as usual was very good. On Wednesday morning (November 12th) Mr. W. Fox called at the Observatory and stated that he had been in communication with Dr. Shaw regarding the unsafe condition of the thermograph screen and wished me to examine and report upon it at once. In order to do this satisfactorily I had to dismount the thermograph tubes as well as the other thermometers, and with the assistance of Mr. Blight, a local builder, took the screen down entirely.

On examination we found it to be so decayed that it was only possible to use the back uprights and lower boards, the roof and front posts being quite rotten. Mr. Blight said that he could not undertake to repair and replace the screen before the following Tuesday. On learning this I reported to Mr. Fox that under the circumstances I felt justified in giving instructions for the work to be proceeded with at once, as otherwise my stay would be unduly prolonged. Advantage was taken on removal of the screen to return the ground underneath and around the thermometers. The screen, having been thoroughly and strongly repaired and painted, was replaced on Tuesday morning, November 18th, and in the course of the afternoon all the thermometers were fitted up again; the zero dots were shifted from the summer to the winter position and the instrument finally started at 5 p.m. The curves which came off on the following day were, after being developed, found to be good.

In the interval of repairing the screen the thermograph clock was taken to pieces and cleaned, as well as the lenses, mirrors, and condensers, whilst the barograph also received due attention. The rain gauge clock was cleaned and rubbings were taken of both the self-recording and spare funnels.

The anemograph was in excellent order, the bearings of all parts being well oiled and in good condition, and the cups and stays quite sound. After the usual cleaning and replenishing the bearings with fresh sperm oil the orientation was examined and found correct. All the thermometers were tested in water at 50° Fahr. and a comparisom made of the standard barometer by means of the Inspector's barometer M.O. 886.

T. W. B.

Kew.—Not yet received.

Aberdeen Observatory, October 7th to 9th.—Professor Niven stated that he had had fitted up the new supporting piece with screw attached (made by Mr. Adie) for raising and lowering the barograph tube in the event of any abnormal change taking place in the height of the barometer, and that it was now quite satisfactory. On examining the barograph I found that two of the screws which bind the upper metal plate to the lower plate of the cistern had given way, but as I was unable to remove the broken screws owing to corrosion, I got Mr. Munro to make two brass clamps, which have since been fitted to the cistern, so that the instrument is now quite secure.

The usual cleaning of the barograph and thermograph clocks was duly performed and the lenses and other parts seen to.

The anemometer was completely dismounted and cleaned, the bearings afterwards being lubricated with fresh sperm oil. The clock and recording parts were also examined and oiled and the orientation tested, which was found correct. Careful attention was given to the rain gauge, and rubbings were taken of both the self-recording and spare funnels.

All the thermometers were tested in water at a temperature of 50° Fahr.

A new pen for the rain gauge and a small bottle of ink were supplied to the Observatory.

T. W. B.

Fort William, September 27th to 29th.—Mr. Rankin was unfortunately ill at the time of my visit, and I did not get an interview with him until after the instruments had been examined and cleaned.

The photography was fairly good, but the sheets were more or less discoloured by stray light. In the case of the thermograph it was noticed that a portion of the black had flaked off the dry bulb tube, and in consequence I dismounted the thermometer and reblackened the stem. A cardboard shield was fitted up in the barograph box to keep out any reflected light from falling upon the paper. With regard to the ventilation of the instrument room at night, I think that this would be improved by removing a pane of glass from the window and substituting a lowered board screen; this Mr. Rankin promised to have carried out.

The clocks of both the barograph and thermograph were taken to pieces and cleaned, and also the lenses, mirrors, and condensers carefully wiped.

The rain gauge clock was cleaned and rubbings were taken of both the self-recording and spare funnels.

All the thermometers were tested in water at 56° Fahr.

A new pen for the rain gauge was supplied to the Observatory.

T. W. B.

Glasgow Observatory, September 24th to 26th.—All the instruments here were found working satisfactorily, excepting that the anemometer clock had stopped on the morning of my visit. I therefore first dismounted the anemograph and cleaned the recording parts and clock and attached new cords to both the weight and winder. The glazed cover which shields the recording apparatus from

dust came to pieces when being removed, the glue at the joints and some parts of the woodwork having quite perished through age ; but Dr. Becker thought that it could be mended, and promised to have it seen to.

The outside parts of the anemometer were also taken down and thoroughly cleaned and fresh sperm oil applied to all the bearings, after which the orientation was examined and found correct. The cups, fans, and stays are in good condition, having been quite recently painted.

At the end of June last a Dines' pressure tube anemometer was erected on a 3 inch iron pipe, which is secured by iron ties to the Robinson anemometer stand, and which is placed on the north-east side. The position was selected by Professor Becker so that the tube would have the least possible effect on the records of the cup anemometer, the winds being less prevalent from that quarter. The head of the pressure tube is about $4\frac{1}{2}$ feet higher than the cups, whilst the latter revolve at a distance of one foot from the iron tube, but to what extent the records might be influenced can only be ascertained after trial. The method of fixing the Dines instrument is shown on the plan drawn by Mr. Munro which is attached to this report. Professor Becker would like to have it returned to him after it has been examined.

As regards the barograph and thermograph, the usual cleaning of the clocks was performed and the lenses and other parts attended to. The rain gauge was also examined and the clock oiled, after which rubbings were taken of both the self-recording and spare funnels. All the thermometers were tested in water at a temperature of 55° Fahr.

A small bottle of ink for the rain gauge pen was supplied to the Observatory.

T. W. B.

B.—Anemograph Stations.

(See Minutes, page 75.)

Deerness, October 2nd and 3rd.—On visiting this station Mr. Spence reported that the corner beams fixing the anemometer hut to the stone-work, upon which it rests, had become rotten at the base. On examination I found that three out of the four corner posts were quite decayed and required renewing. We got the local joiner to give an estimate for supplying three new beams, including cement for masonry work and repainting the hut and anemometer, which came to about three pounds. As the season was getting late I thought that I was justified in asking Mr. Spence to get the work done at once rather than wait till I sent in my report to the Council.

Instructions were given to the Observer to be more particular in future as to the agreement of the times as shown by the traces and clock. The anemometer was in good order ; all the bearings were well oiled, and the instrument evidently receives careful attention.

I dismounted the external parts, and, after cleaning, the bearings were supplied with fresh sperm oil and the orientation was examined and found correct.

The clock and recording apparatus were also attended to.

T. W. B.

C.—Sunshine Stations.

(See Minutes, page 77.)

Margate, October 6th.—The sunshine recorder here has, since it was last inspected, been removed to a new site, scarcely so good as the former one, but more readily accessible and affording a nearly perfect horizon. It is now placed on the parapet of a tower formerly used as a pumping station for the water supply, and is 40 feet above the ground. The instrument is of the "universal" pattern ; and although the lense is good the frame is not satisfactory and ought to be replaced by one of another pattern. The azimuth adjustment of the recorder was faulty and the lens was not central in the bowl ; the latter was ratified, and the adjustment for meridian made as accurately as could be done by compass.

R. H. C.

Broadstairs, October 7th.—The meridian adjustment here is not quite accurate, but the base is clamped to some water cisterns in such a way that it could not be moved very readily. The exposure is perfect. It is under consideration to shift the instrument to a water tower close to the office of the Urban District Council, where the exposure would be quite as good and the instrument would be more directly under Mr. White's control.

R. H. C.

Ramsgate, October 7th.—This is a new station and the instrument had not been permanently fixed in its position ; some readjustment was needed before this could be done. The exposure of the instrument is most satisfactory, and an excellent stand has been erected for it upon the ridge of the roof of the Corporation Offices. The arrangements for the changing of the cards appeared to be quite satisfactory, and I think the station will yield a reliable record of sunshine.

R. H. C.

CORRECTIONS TO THERMOMETERS.

(See Minutes, page 82.)

Corrections required to be applied to the readings of the various instruments to make them agree with the Inspector's standard.

Station.	Inspectors' Standard Corrected.	Dry Bulb.	Wet Bulb.	Maximum.	Minimum.	Grass minimum.	Spare.	Remarks.
Coventry	48·0	− 0·3	− 0·3	− 0·5	0·0	+ 1·2	—	Spirit in grass min. had been re-united.
Cromer	53·0	0·0	0·0	0·0	+ 0·5	+ 1·3	—	Spirit in grass min. had been re-united.
Falmouth	50·0	− 0·5	0·0	− 0·6	+ 0·2	—	—	

486. *Reports of Work for November* :—

MARINE BRANCH.

2nd December, 1902.

Examined 13 new meteorological logs and 1 short meteorological log.

Discussion south of the Equator, between the west coast of Africa and 90° W. longitude. Preparing Ocean wind charts for engraving and publication; also examining Admiralty Sailing Directions for notes of wind and weather on African coast. May and June Charts completed and sent for engraving. January and February charts corrected and returned for press.

Indian Ocean District—from latitude 30° N. to 30° S. Preparing and extracting data in Office logs.

Monthly Pilot Chart of the North Atlantic and Mediterranean :—December proofs and revises examined and passed for press; January, 1901, sent to lithographer; and February in preparation. Charting sea temperatures for September, October, and November, 1902; also charting pressure observations for October and November, 1902. Registering and acknowledging reports of sea temperature, barometer, &c., and issuing Charts and fresh supplies of Forms. 143 reports containing observations to be used for the Charts received during the month.

Sailing Directions for China Sea :—Obtaining meteorological results at several stations for new issue by Admiralty.

Board of Trade enquiry:—Obtaining weather information in vicinity of Berwick, November 10th to 18th, 1901, for transmission to Captain Frederick, R.N.

CAMPBELL HEPWORTH.

OBSERVATORY BRANCH.

1st December, 1902.

Hourly Means.—The volume for 1899 has now been completed and is ready for press.

Examination Work.—The curves and tabulations have been completely checked for 1901, and considerable progress has been made with the work for the current year.

Kite Experiments.—Two-minute measurements of the data given by the meteorograms obtained at Crinan have been made, and preliminary curves are now been drawn from the results.

Miscellaneous.—(1) Wind data for east coast completed and memorandum drawn up for the War Office.

(2) Preliminary trial made of sunshine recorders from Bournemouth. Accuracy of Harrogate sunshine tabulations tested. Copies made of Strathpeffer sun records.

(3) Pressure-tube anemometer returned from Scilly; examined and tested after repair. Recording portion of anemometer returned from Yarmouth; examined.

(4) Ben Nevis Observations copied and sent to Prof. Hergesell.

(5) Harmonic co-efficients of Kew maximum temperature for 30 years calculated.

(6) Holyhead anemograms tabulated and copies sent to Dublin.

(7) Diary of operations for 1903 prepared and passed through the press.

One ordinary inquiry.

During the month the Forecast Branch has (1) made remeasurements of barometer and thermometer curves, and comparison of tabulated and standard readings for Kew, for January, February, March, and October, 1902; and for Aberdeen, October, 1902; and

(2) Tabulated anemograms for Shields for June to September, 1902, and for Deerness for September, 1902.

R. H. CURTIS.

MONTHLY RETURN OF "A." AND "M.O." INSTRUMENTS.

November, 1902.

—	Barometers.	Aneroids.	Thermometers. Ordinary.	Maximum.	Minimum.	Solar Radiation.	Terr. Radiation.	Screens.	Hydrometers.	Rain Gauges.	Anemometers.	Storm Cones.	Sunshine Recorders.	Glass Spheres.	Miscellaneous.
"A" ACCOUNT.															
Dr.															
On charge, 1st Nov., 1902	51	137	188	116	130	—	—	44	37	2	—	—	—	—	
Received since	8	21	119	4	6	—	—	1	—	—	—	—	—	—	
	59	158	307	120	136	—	—	45	37	2	—	—	—	—	
Cr.															
Sent out during month...	7	25	29	—	4	—	—	7	—	—	—	—	—	—	
On charge, 1st Dec., 1902	52	133	278	120	132	—	—	38	37	2	—	—	—	—	
"M.O." ACCOUNT.															
Dr.															
On charge, 1st Nov., 1902	23	2	13	9	4	2	6	—	17	8	1	8	2	2	1 Barograph, 1 Hygrograph, 1 Thermograph.
Received since	6	—	128	—	—	—	—	2	8	—	—	—	2	2	
	29	2	141	9	4	2	6	2	25	8	1	8	4	4	
Cr.															
Sent out during month...	5	—	82	—	1	—	—	2	14	—	—	3	3	3	1 Hygrograph, 1 Barograph.
On charge, 1st Dec., 1902	24	2	59	9	3	2	6	—	11	8	1	5	1	1	1 Thermograph.

3rd December, 1902. R. F. WALLACE.

FORECAST AND STORM WARNING BRANCH.

November, 1902.

Daily Weather Report, 1902.—All numbers issued promptly. Corrections and additions (monthly) sheet for October issued. New copy for Maps IV. and V., page 2, prepared to end of February. Daily sunshine values calculated for averages, for the whole year, and necessary tables prepared.

Weekly Weather Report, 1902.—Charts, daily remarks, general notes, &c., prepared and issued promptly each week.

Monthly Supplement.—Notes on page 1, some of the lithographic maps, to October, published.

Storm Warning Checking (primary).—Done to date.

Forecast Checking (8.30 p.m.).—Done to date by Mr. Lempfert: summarised in this branch.

Checking of Observatory Records, &c.—Kew barograms and thermograms, January to March, 1902, done; 40 readings checked monthly—maximum and minimum temperatures and "jumps"; ditto October; Aberdeen, ditto. N. Shields anemograms, June to September, 1902, tabulated; Deerness, ditto for September.

Charts for 9 a.m. and noon, for December 30th, 1900, drawn under Mr. Shaw's instruction.

Investigation as to times of arrival of Portuguese and Spanish telegrams—done.

Inquiries by Telegraph.—Answered—11. Very much delay has been caused by frequent interruptions to telegraphic communications between Meteorological Office and "T. S."

Routine work of room satisfactorily maintained.

FREDC. GASTER.

STATISTICAL AND LIBRARY BRANCH.

November, 1902.

1. Issue of Publications:—

Daily and weekly publications regularly issued.

Monthly Summary of the "Weekly Weather Report" for September, 1902, received and issued.

Pilot Charts for December, 1902, received and 321 copies issued; also 171 copies of charts for previous months issued to Captains of ships and others.

Presentation copies of publications, 105 in all, issued to Captains and Officers of ships and others.

Supplement to "Temperature Tables for the British Islands" received and 208 copies issued.

Quarterly Summaries of the "Weekly Weather Report" for the second and third quarters of 1902, received and issued.

2. Statistical and Station Work :—

Tables for the weekly issues of the "Weekly Weather Report" prepared to date and carried through the press.

Tables and Maps Nos. 1, 3, and 4 for the Monthly Summary of the "Weekly Weather Report" for October, 1902, prepared and carried through the press.

Ten-day Means of Observations at five British Stations prepared and regularly supplied to Dr. Neumayer, of Hamburg.

Results of Daily Observations of Temperature and Rainfall prepared and regularly supplied to the Registrars-General for their Weekly Returns, viz., for—

England and Wales from ... ... 14 Stations.
Ireland from ... ... 6 Stations.

"Returns from Stations of the Second Order" for 1899 proceeded with, and pages signed for press.

Inspectors' reports for 1902 read and corrected in proof.

3. Library :—

Accessions to Library received, press-marked, and catalogued on cards.

Fifty volumes of publications received from binding; examined, press-marked, and placed on shelves.

4. Inquiries :—

Sixty-one inquiries were dealt with during November. Twelve of these were by letter, but in 49 cases personal application was made. In 15 cases of personal application payment was made for the preparation of the information supplied.

Mr. Hodgson, on behalf of Sir Norman Lockyer and Dr. W. J. S. Lockyer, was engaged during part of the month in extracting data respecting pressure at various Foreign and Colonial Stations.

5. General :—

Mr. Bracey returned to the office on November 10th, after five weeks' absence on sick leave, and rendered assistance in Forecast Branch on three days during the month.

JOHN A. CURTIS.

487. Submitted—the following statement of accounts :—

	£	s.	d.
Cash balance on 18th November	4,106	2	2
Receipts from 19th November to 2nd December ...	13	18	7
	4,120	0	9
Cheques drawn from 19th November to 2nd December	782	1	3
Cash balance on 2nd December	£3,337	19	6

488. Submitted—the following list of publications, which had been received since the last meeting :—

Algué, José.—Ground temperature observations at Manila. 1896–1902.

Budapest, Kön. Ung. Reichsanstalt für Meteorologie und Erdmagnetismus.—Bericht über die Thätigkeit der Kgl. Ung. Reichsanstalt für Meteorologie u. Erdmagnetismus und des Central-Observatoriums in O.-Gyalla im Jahre, 1901.

—— —— Namen-und Sachregister der Bibliothek. Bearbeitet von Ladislaus v. Szalay.

—— —— Publicationen, 1902. Band 5. Die Methoden und Mitteln der Wolkenhöhenmessungen. Von Nicolaus Thege v. Konkoly, jr.

Carlsruhe, Centralbureau für Meteorologie und Hydrographie.—Niederschlagsbeobachtungen der meteorologischen Stationen im Grossherzogthum, Baden. 1902, 1. Halb.

Digby, William.—Natural law in terrestrial phenomena : a study in the causation of earthquakes, volcanic eruptions, wind-storms, temperature, rainfall, with a record of evidence.

Hamburg, Deutsche Seewarte.—Deutsche ueberseeische meteorologische Beobachtungen. Heft 11. Meteorologische Beobachtungen in Deutsch. Ost-Afrika gesammelt und bearbeitet von Dr. H. Maurer. Theil 2.

Paris, Bureau Central Météorologique de France.—Annales . . . . publiées par E. Mascart. Année 1899, i.–iii. 3 vols.

Trieste, Osservatorio Astronomico Meteorologico.—Rapporto annuale . . . . contenente le osservazioni meteorologiche di Trieste e di alcune altre stazioni Adriatiche per l' anno 1899.

Vaughan, J. D. W.—Meteorological observations taken at Suva during 1901.

Zi-ka-wei, Observatoire Magnétique et Météorologique.—Bulletin mensuel. Tome 26, année 1900.

63, *Victoria Street, S.W., 17th December*, 1902.

PRESENT :

SIR R. STRACHEY, IN THE CHAIR.

PROFESSOR DARWIN. | THE HYDROGRAPHER.

MR. SHAW (*Secretary*).

489. The Minutes of the last meeting (3rd December) were read and confirmed.

490. *Balloon and Kite Observations: International Co-operation* (Minutes 409, 474).—Read—The following letter and enclosure (M.O. 2,380) :—

M.O. 2,380.

Burlington House, London, W.,
12th December, 1902.

SIR,

YOUR letters of the 4th instant (M.O. 2,181) relating to a communication received from the Secretary of State for Foreign Affairs with reference to a resolution passed by the International Committee for Scientific Aeronautics, and of the 6th November, relating to a Treasury enquiry into the grant to the Meteological Council, have been laid before the President and Council of the Royal Society, and I am directed to reply as follows :—

With reference to the communication received from the Foreign Office relative to aeronautics, the President and Council of the Royal Society are in full accord with your Council. They recognize the necessity of an additional special grant for the purpose of carrying out observations upon the upper air by means of balloons and kites in the British Isles and India, and are prepared to join your Council in approaching His Majesty's Government on the subject.

I enclose a copy of a letter which has been addressed by the President and Council to the Foreign Office on the subject.

With reference to the proposed general enquiry into the administration of the grant to the Meteorological Council, and the whole subject of the legitimate requirements of a national system of meteorological observation and investigation, I am to assure your Council that they will have the sympathetic support of the President and Council of the Royal Society.

I am, &c.,
M. FOSTER,
Secretary, R.S.

The Secretary,
Meteorological Office.

M.O. 2,380.

12th December, 1902.

SIR,

YOUR letter of the 1st October has been carefully considered by the President and Council of the Royal Society, who have, in accordance with the wishes expressed in your letter, consulted the Meteorological and Aeronautical Societies, and the Meteorological Council, and I am directed to make, in reply, the following statement :—

The investigation of the upper air is undoubtedly of great scientific importance, and observations carried out in the British Isles and India would have exceptional interest. Such an investigation, however, is not unattended with difficulties, and I am directed especially to call attention to a primary difficulty which arises from the want of the necessary funds.

To carry out the observations efficiently would involve an annual expenditure of not less than £500, and money would be needed for the initial outlay. The Meteorological Council are not able to defray such an expenditure out of their income, nor can such a large annual sum be met by the Treasury Grant-in-Aid for Scientific Investigations.

The attitude of the Royal Society towards the question raised by the resolutions of the International Committee must therefore depend on whether H.M. Treasury is prepared to make a grant to defray the expenses of the suggested investigations. The Royal Society is in communication with the Meteorological Council with a view to approaching H.M. Treasury on this subject, and in the meantime the importance of the investigations under reference has been impressed upon the Indian Government in a letter addressed to H.M. Secretary of State for India.

I am, &c.,
M. FOSTER,
Secretary, R.S.

The Under Secretary of State
for Foreign Affairs.

491. *Storm Signals* (Minute 472).—The Secretary reported a reply to his inquiry from Mr. P. Curran, Harbour Master at Dungarvan (M.O. 2,356), stating that he was

unable to hoist any signal (on 12th November) as he was waiting to get leave from the War Department "to erect a pole or mast on our barrack wall, which is the most conspicuous place in our harbour."

Read also the following letters (M.O. 2,311 and M.O. 2,342) from Mr. J. T. Hudson :—

M.O. 2,311.

N.R. 5,606. Glenbeg, Dungarvan,
3rd December, 1902.

DEAR SIR,

I BEG to acknowledge receipt of your letter of the 27th ult., together with copy circular No. 27 and pamphlet "Weather Intelligence," for which I am obliged.

Perhaps you would be good enough to submit to your Council that since the date of my letter the Urban District Council of Dungarvan have, I understand, made arrangements to exhibit storm signals within the Port of Dungarvan, but I submit that these storm signals will be of no benefit and will not be seen by the large fishing population who reside at a village named Ballinagoul within the harbour of Dungarvan.

For your information I may state that there are no fishing boats fishing from Dungarvan itself, and that the entire fishing fleet anchor and seek shelter at Ballinagoul where the fishermen reside, and that the signals would be best observed by them at the Coastguard Stations at Helvick Head or Ballinacourry Point, which are both situated near the mouth of the harbour.

I have noticed with great satisfaction a letter from the Admiral Superintendent of Naval Reserves signifying that he will meet the suggestions of having signals hoisted at any Coastguard Station on request by your Office. Might I therefore press on you the hope that the Meteorological Office will see the necessity of carrying out the suggestions which I have ventured to make.

Yours faithfully,
J. T. HUDSON.

The Secretary,
Meteorological Office.

M.O. 2,342. Glenbeg, Dungarvan,
8th December, 1902.

DEAR SIR,

IN reply to your letter of the 6th inst., for which I am obliged, I understand that the telegraphic and telephonic communication is officially open to Helvick Head and Ballinacourty Point between 8 o'clock a.m. and 8 p.m., on each day of the week, Sunday excepted.

I would submit that inasmuch as the fishing boats are not absent from their moorings, as a rule, between 8 p.m. on Saturday and 8 a.m on Monday, that storm warnings would not be necessary on Sundays, although, of course, it would be desirable on an earlier hour on Monday morning.

Permit me also to suggest that if hereafter it became desirable, the system, so far as it affects Sunday warnings, might be dealt with on the same lines as at present, I understand, exists for "life-saving arrangements."

I do not know whether your Office will take into consideration the desirability of continuing the present storm signals. I would submit for their consideration that not only the direction of the wind but the probable veering point should be signalled.

I have suggestions for carrying out this object, but the experts at your disposal could not receive any assistance from any suggestions which I might make.

Yours faithfully,
J. T. HUDSON.

W. N. Shaw, Esq.,
Secretary, Meteorological Office.

The Secretary was directed to write to the Superintendent of Naval Reserves asking him to obtain for the information of the Council a report from the District Coastguard Officer as to the most appropriate place for hoisting the signal, in view of the requirements of the district.

492. *London Fog Inquiry* (Minute 473 (2)).—The Secretary reported (1) that he had ascertained from the Director of the National Physical Laboratory that the gas supply at Kew Observatory was not adequate for the requirements of a captive balloon, but that there were probably facilities at Bushy for carrying out the experiments, and that he was willing to go into the details of the requirements with Mr. Lempfert.

(2) That he had, in consequence, arranged for Mr. Lempfert to go down to Bushy with Mr. E. S. Bruce, Secretary of the Aeronautical Society, at some time convenient to the Director, in order to obtain precise information as to the requirements, and that he proposed to arrange for the experiments to go forward if no serious expense were involved.

Approved.

493. *Anemograph Stations, Fleetwood* (Minute 463).—Read—The following letter (M.O. 2,358) :—

M.O. 2,358.

Town Hall, Fleetwood.
10th December, 1902.

SIR,

YOUR letter of the 24th ulto. has been placed before the Finance, &c., Committee of this Council, and I have received instructions to state that if your Council will continue the payments already made to the Council, without reference to the amounts being paid for the services of a caretaker, the Council will continue the arrangements which are now in force.

The Council find that the duties have hitherto been performed by an officer and servants of the Council, and the present arrangement has been made with a view to prevent any friction as to the purposes for which your payment is made.

I trust that this decision will meet with the approval of your Council.

I am, &c.,
J. TILDSLEY,
Clerk.

The Secretary,
Meteorological Office.

The Secretary was authorised to recommence the payment of £10, which lapsed when the anemometer was dismounted, in the form desired by the Urban District Council, to date from the re-erection of the instrument.

494. *Royal Agricultural Society.*—The Secretary reported that he had been requested by the Society to act as one of the judges, with Mr. F. S. Courtney, Consulting Engineer of the Society, in a competition of wind motors on the permanent Show Ground of the Society at Willesden between 1st March and 30th April, 1903, and that he proposed to undertake the duty.

Approved.

495. *Observatories: Valencia:* (1) *Grazing* (Minute 413).—Reported—Further correspondence with reference to this matter, including a letter from Mr. Cullum (M.O. 2,394) expressing the opinion, after seeing Mr. Leslie (the tenant), that it was "unnecessary to proceed further in the matter as he is content with a verbal understanding."

It was resolved to take no further action in the matter.

(2) *Repairs to Westwood House.*—Read—M.O. 2,393 from Mr. Cullum enclosing an estimate by Mr. P. Murphy, builder and contractor, Cahirciveen, for repairs to the roof, &c., of Westwood House at a cost of £40.

The Secretary was directed to ask Mr. Cullum to obtain an estimate of the repairs he considered necessary.

496. *Instruments:*—

RETURN of ADMIRALTY INSTRUMENTS in the OFFICE and at HIS MAJESTY'S DOCKYARDS for the QUARTER ending 30th September, 1902.

Place.	Particulars.	Barometers.		Thermometers.			
		Mercurial.	Aneroid.	Ordinary.	Max.	Min.	Screens.
Meteorological Office.	Available 1st July, 1902	69	129	27	67	65	71
	Received, new	—	—	144	—	—	—
	„ repaired and cleaned.	41	44	26	25	27	—
	Total	110	173	197	92	92	71
	Issued	14	29	24	6	11	21
	Total available 1st Oct., 1902	96	144	173	86	81	50

RETURN of ADMIRALTY INSTRUMENTS for the QUARTER ending 30th September, 1902.

Depôts.	BAROMETERS.								THERMOMETERS.															
	Mercurial.				Aneroid.				Ordinary.				Maximum.				Minimum.				Screens.			
	Est.	Store.	Sur-plus.	Short-age.	Est.	Store.	Sur-plus.	Short-age.	Est.	Store.	Sur-plus.	Short-age.	Est.	Store.	Sur-plus.	Short-age.	Est.	Store.	Sur-plus.	Short-age.	Est.	Store.	Sur-plus.	Short-age.
Portsmouth	25	22	—	3	55	53	—	2	150	132	—	18	50	58	8	—	50	60	10	—	25	14	—	11
*Devonport	25	22	—	3	55	41	—	14	150	136	—	14	50	51	1	—	50	46	—	4	22	17	—	5
*Chatham	25	18	—	7	55	38	—	17	150	133	—	17	50	48	—	2	50	46	—	4	25	22	—	3
*Sheerness	6	1	—	5	15	9	—	6	30	17	—	13	10	7	—	3	10	8	—	2	10	7	—	3
Queenstown	2	2	—	—	2	4	2	—	3	10	7	—	3	8	5	—	3	8	5	—	—	3	3	—
(Dockyards, Home) Total	83	65	—	18	182	145	2	39	483	428	7	62	163	172	14	5	163	168	15	10	82	63	3	22
Gibraltar	2	2	—	—	2	3	1	—	4	8	4	—	3	3	—	—	3	3	—	—	—	—	—	—
*Malta	11	9	—	2	15	13	—	2	60	59	—	1	10	9	—	1	10	9	—	1	1	1	—	—
Bombay	4	3	—	1	3	3	—	—	10	5	—	5	4	3	—	1	4	4	—	—	1	2	1	—
Halifax	3	3	—	—	4	4	—	—	20	16	—	4	4	5	1	—	4	5	1	—	1	2	1	—
Bermuda	3	2	—	1	4	4	—	—	20	9	—	11	4	3	—	1	4	4	—	—	1	1	—	—
Jamaica	3	2	—	1	2	4	2	—	10	10	—	—	2	—	—	2	2	1	—	1	1	1	—	—
Cape of Good Hope	7	7	—	—	8	10	2	—	33	37	4	—	8	9	1	—	8	7	—	1	2	2	—	—
Trincomalee	3	2	—	1	3	2	—	1	10	14	4	—	4	5	1	—	4	4	—	—	1	1	—	—
*Hong Kong	17	11	—	6	21	15	—	6	87	70	—	17	21	12	—	9	21	21	—	—	5	11	6	—
*Coquimbo (1st April, 1902)	2	1	—	1	4	3	—	1	15	11	—	4	2	3	1	—	2	4	2	—	1	1	—	—
*Sydney	5	—	—	5	6	8	2	—	25	9	—	16	6	2	—	4	6	1	—	5	1	1	—	—
*Esquimalt	4	2	—	2	5	8	3	—	15	19	4	—	2	2	—	—	2	2	—	—	1	2	1	—
(Dockyards, Abroad) Total	64	44	—	20	77	77	10	10	309	267	16	58	70	56	4	18	70	65	3	8	16	25	9	—
Grand Total and Net Shortage at Depôts	147	109	—	**38**	259	222	—	**37**	792	695	—	**97**	233	228	—	**5**	233	233	—	—	98	88	12	**22**
Meteorological Office... ...	45	**96**	51	—	120	**144**	24	—	250	**173**	—	77	80	**86**	6	—	80	**81**	1	—	50	**50**	—	—
Repairing	—	—	23	—	—	—	10	—	—	—	—	—	—	—	7	—	—	—	28	—	—	—	—	—
Returnable from Depôts ...	—	—	14	—	—	—	16	—	—	—	9	—	—	—	7	—	—	—	3	—	—	—	—	—
Ordered	—	—	—	—	—	—	—	—	—	—	108	—	—	—	20	—	—	—	20	—	—	—	10	—
Net Surplus or Shortage at M.O.	—	—	88	—	—	—	50	—	—	—	40	—	—	—	40	—	—	—	52	—	—	—	10	—
Proposed to be Ordered ...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	20	—

Approved.

* Supplies forwarded to these Depôts since 30th September, 1902.

R. F. WALLACE. 6th December, 1902.

497. *Fishery Barometer: Boreray, Outer Hebrides.*—Submitted—An application (M.O. 2,054) from Mr. W. Sinclair, Fishery Office, Castlebay, Barra, for a fishery barometer for Boreray, a similar barometer granted by the Council to the adjoining island of Berneray having proved of great service to the fishermen of that island; also a report (M.O. 2,379) upon the application from the Fishery Board for Scotland, stating that Mr. Donald McDonald, merchant, would take charge of the instrument, and also provide a wooden case with glass front for its protection.

The loan of a barometer was authorised under the usual conditions.

498. *Instruments: Kikuyu, British East Africa.*—Read—M.O. 2,389 from Rev. Dr. C. Ruffelli Scott, Church of Scotland Mission, Kikuyu, British East Africa, asking for a grant to the Mission of "three sets of rain gauges . . . wet and dry bulb thermometers, and, if possible, anemometers" in consideration of "regularity in taking observations and sending returns."

The Secretary was directed to report the application to the Foreign Office, with an intimation that the Council were prepared to receive observations and preserve them for reference, or with a view to publication, but they could not undertake to supply observers with instruments.

499. *Colonial and Foreign Stations: Hints for Observers* (Minute 408).—Submitted—Proofs of the edition of Hints for Observers in Tropical Africa, with . . . notes on methods of recording lake levels, prepared in accordance with Minute 408 (3).

The Secretary was directed to send a copy of the proof, after incorporating the corrections by Members of the Council, to the Foreign Office, and to Dr. Mill for comment before having the copies printed off.

500. *Office Staff Messengers* (Minute 480).—Read—M.O. 2,213 from the Commandant of the Corps of Commissionaires.

The Secretary was directed to reply that the change in the arrangement had been in contemplation for some time, and was not dependent upon the circumstances of Commissionaire Taylor's resignation.

501. *Inspections: Supplementary Report, Chatsworth* (Minute 485).

The Secretary was authorised to write to the Duke of Devonshire suggesting the changes recommended by Mr. J. A. Curtis.

502. *Storm Warnings.*—Warnings issued :—

Signals hoisted on eight days; the total number of districts warned, 39.
In 15 districts the warnings were justified by subsequent gales (force 8 and upwards), and in 10 districts by strong winds (force 7 or 6); in 14 districts they were not required.

Gales experienced, for which no Warnings were Issued.—None.

503. *Telegraphic Stations.*—It was resolved that the usual bonus of £3 3*s.* be given to those of the telegraphic observers who have discharged their duties faithfully during the year (Minutes 1,878, p. 22).

504. *Accounts.*—Submitted—The following statement :—

	£	*s.*	*d.*
Cash balance on 2nd December	3,338	16	2
Receipts from 3rd to 16th December	18	8	10
	3,357	5	0
Cheques drawn from 3rd to 16th December	280	8	7
Cash balance on 16th December	£3,076	16	5

505. *Library.*—Publications received since the last meeting :—

Calcutta, Surveyor-General of India.—General report on the operations of the Survey of India Department . . . during 1900–1901.

Dublin, General Register Office.—Detailed annual report of the Registrar-General (Ireland), containing a general abstract of the numbers of marriages, births, and deaths registered in Ireland during the year 1901.

Durban, Natal Observatory.—Report of the Government Astronomer for the year 1901.

* *Gaertringen, F. Frhr. Hiller von.*—Thera : Untersuchungen, Vermessungen und Ausgrabungen in den Jahren 1895–1902, . . . herausgegeben von F. Frhr. Hiller von Gaertringen. 4. Band. Klimatologische Beobachtungen aus Thera . . . bearbeitet von P. Wilski. 1. Teil.

Hepites, S. C.—Materiale pentru climatologia Romaniei. xiv., xv. Repartitiunea ploii pe districte si pe basenuri in Romania in anii 1899, 1900 st. n. xvi. Climatologia Iasilor. 3 papers.

Hobart, Meteorological Department.—Report for 1901.

* *London, Nautical Almanac Office.*—The nautical almanac and astronomical ephemeris for the year 1903 for the meridian of the Royal Observatory at Greenwich.

London, Solar Physics Committee.—The sun's spotted area, 1832–1900. A statement of the mean daily area in each synodic rotation of the sun, based upon data collected at the Solar Physics Observatory, South Kensington.

Murat, I. St.—Clima dilei de dece Maiŭ.

—— —— Istorical lucrărilor meteorologice în România.

* *Nippoldt, A.*—Ueber die meteorologische Natur der Variationen des Erdmagnetismus.

Rotch, A. L.—The international aeronautical congress at Berlin (May 20–24, 1902).

* *Sabine, Sir Edward.*—Biographical sketch of. With portrait. Extracted from a "Memoir of General Sir Edward Sabine," by the late General Sir Henry Lefroy, published in Proc. R. Artillery Inst., 12, No. 5, Woolwich, 1883.

* Purchased.

63, *Victoria Street, S.W., 14th January*, 1903.

PRESENT :

SIR R. STRACHEY (IN THE CHAIR).

MR. BUCHAN. | THE HYDROGRAPHER.

MR. SHAW (*Secretary*).

506. The Minutes of the last meeting (17th December) were read and confirmed.

507. *Proposed Treasury Inquiry* (Minute 448).—It was agreed that copies of a memorandum upon the work and organisation of the Office, drawn up by the Secretary in consultation with the Chairman, be circulated among the members of the Council.

508. *London Fog Inquiry* (Minute 473).—Submitted—The following report by Mr. Lempfert :—

REPORT ON ARRANGEMENTS FOR EXPERIMENTS WITH A CAPTIVE BALLOON.

13th January, 1903.

Capacity, &c., of Balloon.—Messrs. Gaudron & Spencer, the makers of Mr. Alexander's balloon, certify that the capacity is 3,745 cubic ft., weight (exclusive of net) 65 lbs.

Site of Experiments.—I visited Bushy House on 22nd December with Mr. E. S. Bruce, the Secretary of the Aeronautical Society, to discuss particulars of the experiments with Dr. Glazebrook. Mr. Bruce selected the field in front of the house as the most suitable place from which to fly the balloon. Dr. Glazebrook has obtained permission from the Board of Works to use this field on the understanding that the experiments are only of a preliminary nature.

Storing Balloon.—A large unused conservatory affords accommodation for storing the balloon when it is not in use.

Gas Supply.—Dr. Glazebrook has communicated with the Hampton Court Gas Company and has ascertained the following particulars :—

The company will make a connexion (3 ins. wide) with the 3-in. main, and supply the necessary valve and fittings at a cost of £5.

Arrangements for Filling.—The control of the valve will remain with the company, so that notice will have to be given when it is desired to fill the balloon in order that a representative of the company may attend. The gas used will not be passed through a meter, but it will be estimated by the capacity of the balloon as given by the maker's certificate. The cost of gas is 3*s.* 4*d.* per 1,000 cubic ft. The cost of filling the balloon will therefore be about 12*s.*

I have ascertained that the cost of hydrogen is excessive (*see* below), and, by direction of the Secretary, Dr. Glazebrook has been requested to give instructions to the gas company to make the required connexion with the 3-in. main.

Time Required for Filling—Messrs. Gaudron & Spencer estimate that from one to two hours will be required to completely fill the balloon.

Lifting Power of Gas.—The manager of the gas works has informed me that the gas supplied is pure coal gas, free from water gas, and has a lifting power of 35–40 lbs. per 1,000 cubic ft.

Note on the Cost of Hydrogen.—Seeing that £5 appeared a large expenditure for providing connexion with the gas main, I made inquiries as to the cost of hydrogen.

The Brin Oxygen Company could deliver hydrogen in steel cylinders at a cost of 1½*d.* per cubic foot. Even if it were decided to use a specially constructed balloon of gold-beaters' skin, 10 ft. in diameter and of 450 cubic ft. capacity (as suggested by Mr. Bruce), the cost of hydrogen would be 55*s.* for each filling.

The manager of the Brin Oxygen Company stated that he thought we could make our own hydrogen from scrap iron and sulphuric acid at a cost of ½*d.* per cubic foot. This is exclusive of the cost of the plant, and the process would require a long time.

Electrical Generation of Hydrogen.—Using a current of 50 ampères and 70 cells in series, 1 cubic foot of hydrogen could be generated for 0·11 B. T. U. The cost of current per B. T. U. may be 2*d.* or 3*d.* Under the above conditions it would, however, take 23 hours to generate 1,000 cubic ft.

Arrangements with Gaudron and Spencer.—I have arranged with Messrs. Gaudron & Spencer, balloon makers and aeronauts, to fill and send up the balloon on the first occasion. Their charge for a day's attendance at Bushy House is two guineas. On future occasions it is proposed to send up the balloon without the assistance of a professional aeronaut.

Hire of Accessories.—Messrs. Gaudron & Spencer can lend hose pipe, sand bags, and other accessories required to fill the balloon. Their charge for the hire of these articles for the period of the experiments is £1 10*s.*

Rope or Wire for Holding Balloon.—Mr. Alexander suggested a Manila rope 1 in. in circumference for holding the balloon captive, this rope to be hauled in hand-over-hand by a couple of labourers. A rope 1 in. in circumference and 1,500 ft. long weighs 53 lbs., which is more than the balloon can carry.

A rope ¾-in. in circumference weighs about 35 lbs., but the breaking strain of such a rope is set at 140 lbs., a value which might conceivably be reached if a sudden gust of wind should arise.

Steel Wire.—Mr. Gaudron has recently suggested a flexible galvanized steel wire, which appears to be suitable as being light enough and not liable to break through kinking. 1,500 ft. of this wire weigh 23 lbs., and cost £5 ; the breaking strain is given as 3 cwt.

The use of this wire would necessitate also the use of some kind of winding gear.

Approximate Calculation of Lifting Power, &c.—Capacity of balloon, 3,745 cubic ft. ; lifting power of coal gas, 35–40 lbs. per 1,000 cubic ft. ; upthrust on balloon, 130–150 lbs.

Weight of balloon	... ...	65 lbs.
„ net	... ...	18 „
„ 1,500 feet wire	... ...	23 „
„ apparatus	... ...	5 „
		111 „

Excess lifting power, 20 to 40 lbs.

The maximum tension on the wire when vertical in a calm atmosphere would be

$$150 - (65 + 18 + 5) = 62 \text{ lbs.}$$

This is doubled when the wire is inclined at an angle of 30 deg. to the horizon.

Breaking strain of wire, 3 cwt.

Summary of Anticipated Expenditure.

	£	*s.*	*d.*
Gas fittings	5	0	0
Fee to Gaudron & Spencer	2	2	0
Hire of hose pipe, &c.	1	10	0
1,500 ft. of wire	5	0	0
Winding gear, say	4	0	0
	£17	12	0

In addition to the above, 12*s.* worth of gas are required to fill the balloon, and incidental expenses such as the hire of casual labour, which is easily obtained at Bushy, will be incurred.

It was agreed to proceed with the experiments in accordance with the suggestions contained in the report.

509. *Daily Weather Report: Subsidiary Maps* (Minute 54).—The Secretary submitted a proof of a map giving the weekly accumulated temperature for the several districts of the British Isles to take the place of Map IV. of the Daily Weather Report on Thursdays during the current year.

It was agreed that specimens of similar maps for a few weeks from 1st October, 1902, be submitted.

510. *Telegrams from the Azores* (Minutes 412, 475).—Read—Letter (2,467) from M. Mascart suggesting additional information to be included in the telegram from Horta to make up the ten words allowed.

The Secretary was authorised to arrange the matter in correspondence with M. Mascart.

511. *Royal Meteorological Society: Kite Experiments* (Minute 314).—Reported that the barograph constructed from Mr. Dines' designs in accordance with Minute 314 (b) had been reported by Mr. Dines as ready for delivery to the Office, and that it had been set up, for the time being, in the Secretary's room at a cost of £1 12*s.* 6*d.*; that the cost of the instrument was £20 and of one year's charts £1 17*s.* 6*d.*

The payments were sanctioned and the Secretary was authorised to have the instrument tested in the Office by comparison with the readings of a standard barometer at fixed hours in a manner similar to that adopted for the self-recording instruments at observatories.

512. *Cloud Observations in connexion with International Balloon Ascents* (Minute 11 of 5th December, 1900).—Read—The following letter (2,489) and enclosure:—

M.O. 2,489.

Commission Internationale d'Aérostation Scientifique,
Strasbourg, 23 Décembre, 1902.

MONSIEUR ET CHER COLLÈGUE,

VOUS avez bien voulu participer aux observations internationales de nuages. En train de nous occuper de la publication des résultats obtenus jusque là nous sommes amenés à introduire certaines modifications que nous vous prions d'adopter autant qu'elles vous concernent. Le nombre des stations sera plus restreint à l'avenir, pour ne pas trop charger la publication, mais complété en certains points. Concernant votre réseau notre choix est tombé sur les stations de *Greenwich* (Royal Observatory), *Kew* Observatory, *Valencia*, *Ben Nevis*.

En restreignant le nombre des stations, nous attachons la plus grande importance à ce que les observations restantes soient faites avec un très grand soin. Nous insistons particulièrement sur la nécessité d'employer un néphoscope, pour ne pas être privés des indications si importantes de la direction et de la vitesse relative exactes. Nous nous permettons de joindre une instruction, indiquant le mode des observations.

Les publications des observations internationales devant être faites chaque mois *de suite* à l'avenir à partir de janvier 1903, nous vous prions de nous faire parvenir vos observations dans la quinzaine qui suit les jours internationaux, soit par les observateurs mêmes, soit par l'intermédiaire de votre institut.

Le zêle et l'aptitude personnelles des observateurs joue le plus grand rôle dans la qualité des observations de ce genre. Nous ne sommes pas compétents de juger en ce point; nous vous prions donc de nous proposer en temps utile, le cas échéant, des stations mieux choisies.

Recevez tous nos remerciments de nous avoir prêté votre concours précieux jusque là.

Veuillez agréer, Monsieur, l'assurance de notre considération très distinguée.

Le président de la Commission internationale,
H. HERGESELL.

N.B.—*Les jours internationaux* sont fixés pour 1903:—*Vendredi* 9 *janvier*, 5 février, 5 mars, 2 avril, 7 mai, 4 juin, 2 juillet, 6 août, 3 septembre, 1 octobre, 5 novembre, et 3 décembre.

C'est à dire toujours le premier jeudi du mois, comme par le passé, *à l'exception de janvier*.

INSTRUCTION POUR LES OBSERVATIONS INTERNATIONALES DE NUAGES.

1. Les observations seront faites aux jours internationaux et si possible, surtout pour les nuages supérieurs, aussi la veille et le lendemain. On choisira les heures d'observations ordinaires. Si en hiver, il fait encore trop sombre à la première heure, on observera dès qu'une distinction sera possible. Si entre les heures d'observation, des changements importants s'opèrent dans l'état du ciel, p. E. s'il apparaît des nuages dont la direction est importante à connaître, comme des Cirrus, on les notera également, si possible.

2. Outre la Nébulosité générale on notera, dans quelle proportion les nuages observés y participent p. E., Neb. 10, $Ci\text{-}S_{10}$, $Ci\text{-}Cu_3$.

3. Pour l'indication de l'*espèce* on se basera sur la Classification Internationale en citant au besoin les figures ; dans le cas contraire on nous indiquera la Classification choisie. Le plus souvent il sera désirable d'adjouter à la désignation de l'espèce quelques mots explicatifs qu'on pourra aussi mettre dans la rubrique des remarques.

4. La *Direction* doit être déterminée avec toute la précision possible ; avec le néphoscope on l'obtient facilement à quelques degrés près le plus souvent ; la désignation N.N.W., S.S.E. est souvent insuffisante.

5. La Vitesse des nuages sera indiquée en réduisant à une hauteur supposée de 1,000 m., ou bien en indiquant la hauteur, où la vitesse en m. serait égale à l'unité (Hauteur relative = H/V). Ces nombres sont réciproques. Ces déterminations très importantes ne doivent pas être laissées de côté. Mais elles sont très faciles à faire en employant un néphoscope. Outre les instruments connus nous recommandons tout particulièrement pour la facilité et la précision des observations la herse néphoscopique Besson, instrument peu coûteux.

6. On notera aussi le Vent qu'il fait au sol.

7. On ne négligera pas la rubrique des Remarques, en y notant brièvement tout ce qui paraît important (orientation des bandes de Ci, etc.).

EXEMPLE.

Date et heure.	Nébulosité.	Espèce.	Direction.	1,000 m. Vitesse $\frac{H}{V}$	Vent au Sol.	Remarques.
5. IX.		Ci, Fig. 3	W. 50° S.	1,0 1,000		Beau : q.q. Ci le soir.
6. IX. 7h a.	3	Fr-S 3	E. 10° N.	1,6 625	$E._1$	Ci-S à l'horizont W. 9h Formation des Cu commence.
						1h les Ci-S atteignent le zénith.
2h p.	4	Fr-Cu, Cu 2, Fig. 19 ...	S. 35° E.	2,5 400	$S.E._1$	Ci-S en bandes orientées dans la dir. W. 40° S.
		Ci-S 4 mince	W. 62° S.	1,8 550		Halo de 22°.
6h p.	8	Ci-S 8 plus dense tend vers A.-S.	W. 58° S.	2,0 500	$S._2$	Ci-Cu en paquets, se rapprochant dès A-Cu.
		Plus bas Ci-Cu 2 ...	W. 82° S.	1,6 625	$S.W._3$	Les Cu ont disparu.
						9h complètement couvert. 1.
						Le lendemain il pleut, Nimbus uniforme.

N.B.—W. 50° S. veut dire : venant de W. 50° vers S.
Les vitesses sont exprimées ici des deux manières.

The Secretary was directed to report further upon the apparatus recommended and the observations desired.

513. *Observatories, Valencia* (Minute 495 (2)).—The Secretary reported that he had received from Mr. Cullum a revised estimate of £16 for repairs to be carried out at Westwood House by Mr. Murphy (M.O. 12), and that he had instructed Mr. Cullum to have the repairs carried out.

Approved.

514. *Observatories, Valencia: Magnetic Observations* (Minute 437).—It was agreed that the magnetic observations at Valencia be continued on the same terms as before until 31st July, 1903.

515. *Anemograph Stations, Yarmouth.*—The Secretary reported that the traces of the anemometer at Yarmouth had become unsatisfactory ; that he had accordingly sent for the recording part of the instrument and, after inspection, had sent it to Messrs. Munro for repair and for the brass helices, which had got out of shape, to be replaced by silver ones ; and that the apparatus was now ready to be returned to Yarmouth.

Approved.

516. *Observatory Records.*—The Secretary was authorised to replace the leather cases, used for sending the weekly records through the post, by cardboard cases as the leather cases get worn out.

517. *Pilot Charts* (Minute 465).—Submitted the following memorandum :—

MEMORANDUM ON THE NORTH ATLANTIC AND MEDITERRANEAN PILOT CHARTS.

The number of copies of the Pilot Charts published was reduced from 1,000 in May, 1901, to 600 for the month of October, 1901, and for all subsequent months 600 has been the number issued. In the interval observers for the Marine Department have increased, and a sufficient supply has not for some time past been available.

During January, 1902, the meteorological registers (Form No. 51) received from observers numbered 95, and by October the number had increased to 173, the sea surface temperatures charted for these two months being respectively 2,500 and 4,600.

It is suggested that the number of charts published monthly be raised from 600 to 800, the number of official copies being increased by 200. The actual number required at present is 760, made up as follows :—

(Each ship receives two copies, one for the captain and one for the officer who does the work.)

		Ships.	Copies.
We now send monthly two copies to each steamer of the following Atlantic steamship companies contributing observations regularly	White Star	11 ...	22
	Allan	22 ...	44
	American	9 ...	18
	Cunard	10 ...	20
	Dominion	8 ...	16
	Atlantic Transport...	11 ...	22
	Harrison Leyland ...	9 ...	18
	Gulf Transport ...	5 ...	10
	Bibby	1 ...	2
It is proposed to send monthly two copies to each steamer of the following Atlantic steamship companies contributing observations regularly ...	Prince	4 ...	8
	F. Leyland	12 ...	24
	Anchor	5 ...	10
	Elder, Dempster ...	26 ...	52
	Royal Mail	7 ...	14
Two copies each are required monthly for about 79 (the average number of) other steamers contributing observations on their arrival in the United Kingdom			158
Two copies for each of the 10 vessels (average number) in ports of the United Kingdom contributing the usual log for this Office is allowed for ...			20
Copies sent to other recipients of Meteorological Office publications (reduced list) number			101
Total official copies			559
Copies for sale			200
			759

The following statement, showing the number of Pilot Charts sold by agents and by the Board of Trade, from No. 13 onwards, has been supplied by the Stationery Office (M.O. 2202) :—

	Board of Trade.	Agents.	
No. 13 (April, 1902)	30	56	Issued for sale.
„ 14 (May, 1902)	35	26	
„ 15 (June, 1902)	58	25	
„ 16 (July, 1902)	33	25	
„ 17 (August, 1902)	35	25	
„ 18 (September, 1902)	29	25	
„ 19 (October, 1902)	45	25	
„ 20 (November, 1902)	58	25	
„ 21 (December, 1902)	87	25	

With regard to the new arrangement for the sale of the Charts by the Admiralty Agent for the Sale of Charts, it should be mentioned that when the Office commissionaire called at 11, King Street, Tower Hill, and asked for a copy of the November Pilot Chart, he was told he could not get supplied there, they "kept no Monthly Charts at that establishment." He then went to 145, Minories, where, after waiting 20 minutes, a copy was found for him.

518. *Telegraphic Reporting Stations: 7 a.m. Observations.*—Read—Letter (67) from the Deutsche Seewarte calling attention to previous correspondence with the Seewarte (*see* Minutes 30th January and 12th March, 1901); also letter (30) from the observer at Malin Head stating that the signalmen were now in attendance throughout the 24 hours at Malin Head, and that they could forward telegrams at any hour of day or night.

The Secretary was authorised to arrange for observations at 7 a.m. from Portland Bill and Yarmouth for transmission to Hamburg in accordance with the request of the Seewarte, and to pay 1s. per week to the observers for the additional service. He was also authorised to offer to the Seewarte telegrams from Malin Head in place of Blacksod Point, and, if the offer were accepted, to make a similar arrangement with the observer at Malin Head.

519. *Normal Climatological Stations, Deerness.*—Read—Letter (2,427) from Mr. Spence, of Deerness, asking for a payment of £10 per annum for the care of the sunshine recorder and the second order station at Deerness in addition to the £10 paid for the anemometer.

The Secretary was directed to point out that in no case was any payment made for the care of a station of the second order, and the Council were not prepared to make a payment for the care of a sunshine recorder.

520. *Proposed New Stations.*—Read—Letter (63) from Lieut. C. St. B. Sladen, R.E., of the Ordnance Survey Office, Shrewsbury, offering observations, but stating that he had "no Stevenson's screen for thermometers, nor were any of the instruments standard ones."

Also letter (91) from the Rev. J. S. Martin, Exmoor Vicarage, South Molton, stating that it would be possible for him to supply observations for daily reports from a station 1,100 feet above the sea in that neighbourhood. That he had a first-rate set of instruments and a telegraph office close to his house.

The Secretary was directed to make further inquiries.

521. *Instruments: Application from the Marine Biological Association.*—Read—The following letter (2,450) :—

M.O. 2450.

Marine Biological Association of the United Kingdom,
Plymouth, 20th December, 1902.

DEAR SIR,

I UNDERSTAND from Mr. Matthews, who called on you a day or two ago with reference to the meteorological work to be undertaken during the above investigations, that the Meteorological Office would be willing to supply us with instruments for the observations on air temperature and pressure. I should be glad therefore if you could let us have a set of instruments similar to that provided to officers in the Merchant Service, which would, I think, supplement our own instruments.

The first of our periodic cruises will take place in February in the English Channel.

Should there be any special observations which would be of special use to you, we shall be very glad to do anything we are able to carry them out.

I am, &c.,
E. J. ALLEN,
Secretary.

W. N. Shaw, Esq., F.R.S.

The Secretary was directed to reply that, as at present advised, the Council could not regard the occasional observations which would be obtained on board the inquiry ship as being of service to the Office, and that they must therefore decline to lend the instruments.

522. *Logs.*—Eighteen received, three excellent (Capt. W. Duguid, Capt. F. C. A. Lyon, R.N.R., and Capt. D. MacAllister); also three short logs.

523. *Storm Warnings :—*

Warnings Issued.—The signals were hoisted on 13 days ; the total number of districts warned, 91. In 48 districts the warnings were justified by subsequent gales (force 8 and upwards), and in 30 districts by strong winds (force 7 or 6) ; in 13 districts they were not required.

Gales experienced, for which no warnings were issued.—None.

FREDC. GASTER.

524. *Forecasts.*—Read—The following letter (55) from Mr. T. G. Benn, of Newton Reigny :—

M.O. 55.

Newton Reigny, Penrith,
5th January, 1903.

DEAR SIR,

ON the 29th April and 2nd September last I sent you the results of checking 100 and 200 forecasts issued at 11 a.m. I now enclose the results for the whole year 1902, during which period 311 forecasts were issued.

Yours faithfully,
T. G. BENN.

W. N. Shaw, Esq.,
Meteorological Office, London.

	Wind.	Weather.	Average.
Complete success	237	211	224
Partial success	68	88	78
Failure	6	12	9
	311	311	311

525. Forecasts issued at 8.30 p.m. during the month of December, 1902 :—

The letters used have the following signification :—

a = complete success. | c = partial failure.
b = partial (*i.e.*, more than half) success. | d = total failure.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success. a + b.
Scotland, N.	a	36	49	43	
"	b	48	32	40	83
"	c	13	19	16	
"	d	3	0	1	
Scotland, E.	a	32	32	32	
"	b	58	52	55	87
"	c	10	16	13	
"	d	0	0	0	
England, N.E.	a	29	52	41	
"	b	61	35	48	89
"	c	10	13	11	
"	d	0	0	0	
England, E.	a	52	45	49	
"	b	29	42	35	84
"	c	16	13	15	
"	d	3	0	1	
Midland Counties	a	52	52	52	
"	b	39	35	37	89
"	c	6	13	10	
"	d	3	0	1	
England, S.	a	49	36	43	
"	b	42	45	43	86
"	c	6	19	13	
"	d	3	0	1	
Scotland, W.	a	42	52	47	
"	b	48	39	44	91
"	c	10	9	9	
"	d	0	0	0	
England, N.W.	a	61	65	63	
"	b	29	26	28	91
"	c	10	6	8	
"	d	0	3	1	
England, S.W.	a	58	68	63	
"	b	36	23	30	93
"	c	3	6	4	
"	d	3	3	3	
Ireland, N.	a	49	48	49	
"	b	35	39	37	86
"	c	16	13	14	
"	d	0	0	0	
Ireland, S.	a	58	52	55	
"	b	29	39	34	
"	c	10	9	10	89
"	d	3	0	1	
Summary.					
British Islands	a	47	50	49	
"	b	41	37	39	88
"	c	10	12	11	
"	d	2	1	1	

526. *Reports of Work for December*, 1902 :—

MARINE BRANCH.

13th January, 1903.

Examined 14 new meteorological logs and two short meteorological logs.

Discussion South of Equator, between the West Coast of Africa and 90° W. latitude. Preparing ocean charts for engraving and publication.

Indian Ocean District—from latitude 30° N. to 30° S. Preparing and extracting data in office logs.

Monthly Pilot Chart of the North Atlantic and Mediterranean.—January, 1903, proofs examined and passed for press. February chart prepared and sent to the lithographer, and progress made with the preparation of the March chart. Charting sea temperatures for October and November, 1902; also charting pressure observations and obtaining tracks of storms for October and November, 1902. Registering and acknowledging reports of sea temperature, barometer, &c., and issuing charts and fresh supplies of forms. One hundred and sixty-four reports containing observations to be used for the charts received during the month.

Sailing Directions for China Sea.—Obtaining meteorological results at several stations for new issue by Admiralty.

CAMPBELL HEPWORTH,

MONTHLY RETURN OF "A" AND "M.O." INSTRUMENTS ON CHARGE.

December, 1903.

—	Barometers.	Aneroids.	Thermometers.					Screens.	Hydrometers.	Rain Gauges.	Anemometers.	Storm Cones.	Sunshine Recorders.	Glass Spheres.	Miscellaneous.
			Ordinary.	Maximum.	Minimum.	Solar Radiation.	Terr. Radiation.								
"A" ACCOUNT.															
Dr.															
On charge, 1st Dec., 1902	52	133	278	120	132	—	—	38	37	2	—	—	—	—	
Received since	18	15	13	1	4	—	—	—	—	—	—	—	—	—	
	70	148	291	121	136	—	—	38	37	2	—	—	—	—	
Cr.															
Sent out during month...	8	—	11	1	1	—	—	4	8	—	—	—	—	—	
On charge, 1st Jan., 1903	62	148	280	120	135	—	—	34	29	2	—	—	—	—	
"M.O." ACCOUNT.															
Dr.															
On charge, 1st Dec., 1902	24	2	59	9	3	2	6	—	11	8	1	5	1	1	
Received since	8	1	32	2	1	—	—	—	6	—	—	—	—	—	
	32	3	91	11	4	2	6	—	17	8	1	5	1	1	
Cr.															
Sent out during month...	10	—	58	2	1	—	—	—	17	—	—	—	—	—	
On charge, 1st Jan., 1903	22	3	33	9	3	2	6	—	—	8	1	5	1	1	

10th January, 1903. R. F. WALLACE.

OBSERVATORY BRANCH.

1*st January*, 1903.

Hourly Means.—The volume for 1899 has been published and examined before issue.

Examination Work.—The cards and tabulations for Valencia and Kew have been checked and examined to the middle of December, and those for the other three observatories are done for about eight months of the year.

Kite Experiments.—The temperature and humidity observations obtained during 40 kite ascents have been plotted and curves drawn.

Miscellaneous.—(1.) In anticipation of the usual request being made for them, the mean values hitherto supplied for the Kew Observatory Annual Report have been calculated for several months of the year.

(2.) The recording portion of the Yarmouth Anemometer taken to Mr. Munro, and the necessary repairs decided upon.

(3.) Copies of Ben Nevis observations made and sent to Prof. Hergesell.

(4.) An enquiry by Mr. Pritchard, Bangor, *re* wind at Holyhead on November 7th, answered.

(5.) A circular was prepared and sent to the observatories *re* tabulation of sunshine cards.

(6.) The sunshine records from Port Talbot, and two or three other stations, examined for suspected error of adjustment, and instructions for testing the instruments sent.

(7.) Plan prepared for a frame in which to exhibit pressure-tube anemogram at Falmouth.

(8.) Instruction was given to Mr. Clarke, the new observer at Aberdeen. The instruments, curves, and methods of measurement and checking were also explained in detail to Mr. Walker.

During the month the Forecast Branch has given assistance by making remeasurements of barograms and thermograms, and comparing the standard with the tabulated readings for Aberdeen, Fort William, and Falmouth Observatories, for January and February, 1902; and the same for barograms only for March, 1902.

R. H. CURTIS.

FORECAST AND STORM WARNING BRANCH.

December, 1902.

Daily Weather Report, 1902.—All numbers issued—those for December 25th, 26th, 27th were all prepared and printed on Saturday, 27th. Monthly corrections and additions sheets—that for November is almost ready for press. New copy for Maps IV. and V. (p. 2) are now ready, to end of March.

Weekly Weather Report, 1902.—Charts, Daily Remarks, "General Notes," &c., prepared and issued promptly each week (those for Christmas week were one day early).

Monthly Supplement.—Notes on p. 1 and some of the lithographed maps published for November, and in hand for December.

Storm Warning Checking, 1902 (primary).—Done to date.

Forecast Checking, 8.30 *p.m.*—Done to date by Mr. Lempfert. Summary done by Telegraph Branch.

Checking of Observatory Record Tabulations.—Aberdeen.—Barometer and thermometer, January and February, 1902; barometer only, March, 1902. *Fort William.*—Barometer and thermometer, January and February, 1902, and also for October, 1902; barometer only, March, 1902. *Falmouth.*—Barometer and thermometer, January and February, 1902; barometer only, March, 1902. All done. 40 readings checked in each month with the maximum and minimum readings and jumps.

Times of arrival of foreign telegrams, November, 1902, in hand.

Charts (hourly) for December 30th, 1900, in hand by Mr. Brodie.

Routine work of room satisfactorily maintained.

FREDC. GASTER.

STATISTICAL AND LIBRARY BRANCH.

1. Issue of Publications :—

Daily and weekly publications regularly issued.

Monthly Summary of the Weekly Weather Report for October and November, 1902, received and issued.

Pilot Charts for January, 1903, received, and 317 copies issued; also 133 copies of charts for previous months issued to Captains of ships and others.

Presentation copies of publications, 50 in all, issued to Captains and Officers of ships and others.

Hourly Means for 1899 (Official No. 157) received and 139 copies issued.

2. Statistical and Station Work :—

Quarterly Summary of the Weekly Weather Report for the fourth quarter of 1902 well in hand.

Tables for the weekly issues of the Weekly Weather Report prepared to date and carried through the press.

Tables, and Maps Nos. 1, 3, and 4, for the Monthly Summary of the Weekly Weather Report for November, 1902, prepared and carried through the press.

Ten day means of observations at five British Stations prepared and regularly supplied to Dr. Neumayer, of Hamburg.

Results of daily observations of Temperature and Rainfall prepared and regularly supplied to the Registrars-General for their Weekly Returns, viz., for

England and Wales from 14 Stations.
Ireland „ 6 „

Returns from Stations of the Second Order, for 1899, proceeded with, and 24 pages passed for press.

Inspection Reports, for 1902, prepared for sending to the various observers.

3. Library :—

Accessions to Library received, press-marked, and catalogued on cards.

Eighty-eight volumes of publications prepared and forwarded for binding.

4. Inquiries :—

Eighty-eight inquiries were dealt with during December. Twelve of these were by letter, but in 76 cases personal application was made. In 33 cases of personal application payment was made for the preparation of the information supplied.

Miss C. Brown Cave was in attendance during part of the month copying barometrical data for certain Stations.

Mr. Bracey rendered assistance in Forecast Branch on three days.

JOHN A. CURTIS.

527. *Office Furniture.*—The Secretary was authorised to provide a chart table and drawers for the Marine Superintendent's room at a cost not exceeding £6 10*s*.

528. *Accounts*—Submitted—The following statement of accounts :—

	£	*s.*	*d.*
Cash balance on 16th December, 1902... ...	3,076	16	5
Receipts from 17th December to 13th January	4,942	12	10
	8,019	9	3
Cheques drawn from 17th Dec. to 13th Jan.	1,685	16	2
Cash balance on 13th January...	£6,333	13	1

529. *Library.*—Publications received since the last Meeting :—

Aachen, Meteorologisches Observatorium.—Ergebnisse der Beobachtungen am Observatorium und dessen Nebenstationen. Jahrg. 7. 1901.

Azambuja, G. A. de.—Annuario do Estado do Rio Grande do Sul. 1903. Anno 19.

Calcutta, Meteorological Office, India.—Rainfall of India. 11th year, 1901.

Jantzen, V. Willaume.—Climat du littoral Islandais.

Lockyer, Sir Norman, and Lockyer, W. J. S.—On the similarity of the short period pressure variation over large areas.

London, Board of Trade.—Abstracts of the returns made to the Board of Trade of shipping casualties . . . from the 1st July, 1900, to the 30th June, 1901, . . . with charts and appendices.

London, Meteorological Office.—Hourly means of the readings obtained from the self-recording instruments at the five observatories under the Meteorological Council, 1899.

**London, Royal Society.*—International catalogue of scientific literature. First annual issue. B. Mechanics. C. Physics, part 1. F. Meteorology. 3 vols.

Margate, Borough Meteorologist.—Report of the hon. Borough Meteorologist [John Stokes], on the meteorology of Margate for the last 20 years, 1882–1901.

Masó, M[iguel] Saderra.—Report on the seismic and volcanic centres of the Philippine Archipelago.

National Physical Laboratory.—Report, 1901.

Oña, Observatorio.—Observaciones meteorológicas hechas en el Colegio Máximo de la Compañia de Jesus en Oña, Provincia de Burgos. 1902.

Perth, Western Australia, Registrar-General's Office.—Statistical register for the year 1900 and previous years. Compiled in the Registrar-General's office from official returns. Part 12. Miscellaneous.

Preston, A. W.—Meteorological notes. 1882–1885, 1887–90, 1893–1897, 1901. 14 parts.

—— Notes on the great frost of 1890–1891.

—— Notes on the great frost of 1894–1895.

—— Notes on the great gale of 24th March, 1895.

Tacubaya, Observatorio Astronómico Nacional.—Anuario. 1903. Año 23.

Washington, Department of Agriculture, Weather Bureau.—W. B. No. 273. Studies on the statics and kinematics of the atmosphere in the United States. By Frank H. Bigelow.

Wei-hai-Wei.—General report by G. T. Hare. Colonial reports, miscellaneous, No. 20.

Zürich, Schweizerische Meteorologische Central-Anstalt.—Annalen, 1900. "Der Schweiz. meteor. Beob." 37. Jahrg.

* Purchased.

63, *Victoria Street, S.W., 27th January*, 1903.

PRESENT:

SIR R. STRACHEY, IN THE CHAIR.

MR. BUCHAN.	THE HYDROGRAPHER.
PROFESSOR DARWIN.	MR. SHAW (*Secretary*).

530. The Minutes of the last meeting (14th January) were read and confirmed.

531. *Government Inquiry* (Minute 507).—Read—The following letters (219) :—

M.O. 219.

Treasury Chambers, Whitehall, S.W.,
21st January, 1903.

SIR,

I AM desired by Sir Herbert Maxwell to say that the Committee (of which he is Chairman) appointed to inquire and report as to the administration by the Meteorological Council of the Parliamentary Grant, &c., would be glad to receive evidence on the subject from you as representing the Council.

The Committee will meet on Tuesday the 3rd February at 32, Abingdon Street, Westminster, S.W., at 2.30 p.m., and I am directed to inquire whether it would suit your convenience to give evidence at that time. They would also be glad to hear at the same time any other witness whom you may suggest to represent the Meteorological Council.

It would be a convenience if you would furnish me beforehand for communication to the Committee a brief *précis* of the evidence which you wish to give.

I am &c.,
GEORGE L. BARSTOW,
Secretary to the Committee.

Lieutenant-General Sir Richard Strachey, R.E., G.C.S.I., &c.,
Chairman of the Meteorological Council.

M.O. 219.

Treasury Chambers, Whitehall, S.W.,
24th January, 1902.

DEAR SIR,

I BEG to acknowledge receipt of your letter of yesterday stating that you will give evidence on Tuesday the 3rd February to the Committee on the distribution of the Meteorological Grant.

I enclose a copy of the Treasury minute.

Yours, &c.,
G. L. BARSTOW.

TREASURY MINUTE, DATED THE 9TH DECEMBER, 1902.

The First Lord recommends to the Board that a Committee be appointed with instructions to enquire and report as to the administration by the Meteorological Council of the existing Parliamentary Grant, and as to whether any changes in its apportionment are desirable in the interests of Meteorological Science, and to make any further recommendations which may occur to them with a view to increasing the utility of that grant.

The First Lord further recommends that the Committee be composed of the following gentlemen, who have already intimated their willingness to serve :—

Right Hon. Sir Herbert E. Maxwell, Bart., M.P. (Chairman).
J. Dewar, Esq., M.P.
Sir W. de W. Abney, K.C.B., F.R.S.
Sir F. Hopwood, K.C.B., Board of Trade.
Sir T. H. Elliott, K.C.B., Board of Agriculture.
T. L. Heath, Esq., Treasury.
R. T. Glazebrook, Esq., F.R.S.
Joseph Larmor, Esq., F.R.S.

My Lords approve.

A memorandum on the organisation and work of the Office, with notes (A) on the arrangements for weather telegraphy ; (B) on the ordinary work of the Office ; and (C) on the Scientific Staff, was submitted and approved.

532. *Storm Signals, Dungarvan* (Minutes 472, 491).—Read—The following letter (158) and enclosure from the Admiral Superintendent of Naval Reserves :—

M.O. 158.

Naval Reserves, Admiralty, Whitehall, S.W.,
20th January, 1903.

SIR,

WITH reference to your letter of the 5th instant, M.O. 2, on the subject of the exhibition of Storm Signals for the use of the fishing communities at Dungarvan, I now beg to forward a report from the Divisional Officer of Coast Guard, and the District Captain, from which it appears that if a storm signal cone were hoisted at Helvick Head it would be of assistance to the fishing population of Ballingaul, although not an absolute necessity, as there is already one at Mine Head, only four miles away.

There would be no objection to a cone being hoisted at Helvick Head, if supplied, and it could be worked by the Coast Guard at that station.

I am, &c.,
G. H. NOEL,
Admiral Superintendent.

The Secretary,
Meteorological Office.

M.O. 158.

H.M. Coast Guard, Youghal,
14th January, 1903.

SIR

IN compliance with N.R. 5,606 of January 5th, 1903, I have the honour to report as follows :—

The Urban District Council of Dungarvan have now obtained a site from the War Office for a flagstaff on which to hoist a cone, and have arranged to have it hoisted by the Harbour Master. This place is very suitable for the shipping alongside the wharfs at Dungarvan, and consequently the Urban District Council are anxious that the cone should be hoisted there. With regard to Mr. J. T. Hudson's statement that storm signals exhibited within the Port of Dungarvan will be no benefit to the large fishing population who reside at Ballingaul, within the Harbour of Dungarvan, I respectfully beg to submit that a cone might be hoisted near Helvick Head Signal Station, which is what Mr. Hudson would like, and would certainly be the best place for the fishing fleet. At the same time I beg to point out that storm signals are already exhibited at Mine Head, which is only four miles from Helvick Head, and can be seen from the fishing boats as soon as they round the point at Helvick Head and also when fishing to the westward.

I have, &c.,
GEORGE W. CORNISH.

The District Captain,
H.M.S. "Collingwood."

Submitted—

I am of opinion that a storm signal cone at Helvick Head, if provided by the Meteorological Department, could be worked by the Coast Guard, and would be of great assistance to the fishing population of Ballingaul ; but, in view of the one already working at Mine Head, it is not an absolute necessity.

R. E. STOKES REES.
District Captain.

16th January, 1903.

The Secretary was directed to write and ascertain whether storm warning messages could be forwarded to Helvick Head by telephone from some neighbouring coastguard station already supplied with storm signals, and in that case it was agreed that a cone should be supplied to Helvick Head.

533. *Royal Meteorological Society.*—Read Letter (172) from the Secretary of the Royal Meteorological Society, asking for an account of the work done in the Office in the year 1902 for insertion in the Annual Report of the Council of the Society.

The Secretary was authorised to supply information in the same manner as last year (Minutes 222, 240).

534. *National Physical Laboratory : Insurance of Goods.*—The Secretary reported that Mr. Adie (M.O. 163) had increased the charge for verification fee for barometers by 3*d.* on account of the authorities of the Laboratory having charged that amount to cover the cost of insurance of the instruments against risk in transit, as well as fire, theft, and accident while in their custody, in accordance with a circular dated December, 1902, and included with a statement of tests issued by the Laboratory.

The payment of the additional fee to cover the cost of insurance was sanctioned.

535. *Board of Trade.*—The Secretary reported that he had received a request from the Board of Trade (M.O. 206) for information as to the dates of long periods of easterly and north-easterly winds on the north coast of Norfolk in the last ten years.

He was authorised to supply the information as requested.

536. *Normal Climatological Stations:* (1) *Southampton.*—Reported—The receipt of a letter of thanks (M.O. 43) from Mr. J. T. Cook for the presentation of an aneroid in recognition of his long services as observer at Southampton.

(2) *Llandovery.*—Reported—That Mr. J. Watkins, who had contributed returns for 18 years, was now compelled to give up observing on account of ill-health.

The Secretary was authorised to send a letter expressing the thanks of the Council for his long series of observations.

537. *Publications: Proposed Pilot Charts for the Indian Ocean.*—Submitted—The following memorandum from the Marine Superintendent :—

In order that navigators of the North Indian Ocean, Arabian Sea, and Bay of Bengal may have within their reach much of the important information germane to their voyages which is available at this Office, the issue of a Monthly Pilot Chart for those regions is suggested, prepared at the Office, but constructed in co-operation with the Meteorological Department of the Government of India. The discussion of the Indian Ocean District is progressing, and by the end of this year data relating to the northern part should be available for the work proposed. Such valuable aids to safe navigation as wind, pressure, and temperature charts are at present unused by, if not unknown to, the majority of navigators in the British Mercantile Marine, probably in consequence of the high price at which the publications are offered to the public. The Monthly Pilot Chart proposed would be within reach of all. Sailing and steamship routes between various points in the North Indian Ocean considered most advantageous according to the season (matters for debate still among seamen) could be indicated, presumably with advantage to commerce.

538. *Publications: Pilot Charts* (Minutes 465, 517).—It was resolved to apply for 200 additional official copies of the Monthly Pilot Charts of the North Atlantic and Mediterranean.

539. *Publications: Hourly Means* (Minute 478).—Submitted—The following report drawn up by Mr. G. T. Walker at the request of the Secretary :—

REMARKS UPON THE SUGGESTIONS CONTAINED IN A MEMORANDUM IN RELATION TO THE OBSERVATORY DEPARTMENT.

A.—*The Annual Volume of Results of Observations.*

The proposal to replace five-day means of hourly readings by the actual readings themselves seems to me admirable. It is true that for some investigations it is necessary to calculate means, and if the calculation is done once and for all by the Central Office the time of individuals is saved. But it is also true that there are many questions on which light can only be thrown by a study of the actual readings, or a grouping of them in methods different from that of periods of five consecutive days. In such cases the present mode of publication is unfortunate, for five-day means can be got from the actual readings, but the converse is not true.

If it be granted that the publication of the actual readings is desirable, it appears to me that there is not sufficient motive for the labour of calculating the means; the time thereby saved could be spent to greater advantage in research with some definite object in view.

An examination of the annual volumes of meteorological observations of other countries strongly confirms this opinion. The publications of Germany (emanating both from Potsdam and Hamburg), France, Austria, Bosnia and Herzegovina, Croatia and Slavonia (Agram), Russia, Switzerland, New York (private), Canada, Sweden (Upsala), Japan, and China (Hong Kong and Zi-ka-wei), all give the actual hourly readings. In Denmark the readings of alternate hours are given, the United States publish monthly means of hourly readings, and in the Indian Monthly Weather Review are recorded monthly means of readings taken three times a day.

As regards size of page, uniformity happily prevails. All the volumes included in the above list are of the same size* as our Hourly Means, except those of India, Hong Kong, Sweden, and Denmark, which are about $1\frac{1}{4}$ in. taller.

A comparison of the mode of presentation of the figures in the different countries shows that while in our volume the tables occupy in general twice as much space as in foreign ones, the ease of reading in our case is distinctly less. This remark applies to the dry and wet bulb thermometers, the rainfall, and the wind.† In the case of barometer readings the remark has less force: we publish five significant figures (of which the initial figure, a 2 or a 3, could be omitted‡), while the foreign

* To within $\frac{1}{8}$ in. in height.

† Compare, for example, p. 79 of the Hamburg volume for the year 1898, with pp. 218 and 219 of ours for 1898, containing the same number of figures.

‡ As 29·536, 30·149. Compare our pp. 216, 217 (1898) with Hamburg, p. 127 (1898).

tables only require four, of which they *in general* omit the first (a 7). Even thus our barometer readings could be put into half the space without losing legibility, but with a very small loss of convenience in requiring the mental prefix of a 2 or a 3, as the case may be.

As regards the wind, the principle of giving the actual readings instead of quantities based on them is again, I think, applicable with advantage. Instead of giving the calculated N. and E. components it might be more accurate as well as more economical to publish the force and the direction in the manner adopted* in Germany, France, Austria, Switzerland, Sweden (Upsala), Japan, and China (Zi-ka-wei).

It is true that Bigelow has appealed† for the universal adoption of our present method, inasmuch as rectangular components are required for his kinematical analysis; but it is unlikely that the force and direction will not be primarily required for some purposes; and in that case it seems unnecessary to recalculate and transform the readings.

If Dines' wind-pressure records are treated in the method proposed much information as to "wind-structure" will be lost, but the alternatives seem inadmissible; among these are:—

(i.) The reproduction of all the actual tracings of the instrument photographically. This would require probably 183 pages of the annual volume for each observatory, and would be impossibly expensive.

(ii.) The publication of a freehand drawing of the "mean" curve with remarks as to the amplitude of the oscillations and the direction of the wind. This would require for each station three pages per month; it would be more expensive than the limited amount of information given would justify.

(iii.) The publication of readings at a selected number of hours in the day only would, I think, involve a diminution in the usefulness of the record to an extent disproportionate to the saving effected.

In order to increase the scientific value of the hourly readings it would be advisable to add a supplement containing photographic reproductions of records of special interest with a statement as to the points raised in them.

Our present method of treating the sunshine records is to state the total obtained for each hour by summing over the days in a month; thus a whole year's records are compressed into one page.‡ Substantially the same plan is followed in Austria and Germany (Hamburg). In Switzerland the number of hours of sunshine on each day in the year is given (supplement No. 4). The best method seems to me to be that of Potsdam,§ which gives almost as much information as the actual record left by the sun. In this case are given diagrams consisting of straight lines, often broken, corresponding to the marks left by the sun in the recorder. Such a system requires merely half a page a month, and is reliable in printing; by means of it work could be done as to the distribution of sunshine in the day, which would be otherwise impossible.‖

The total number of pages thus taken up by a month's observations would be 4, made up as follows:—

Barograph ... ... (or ½ if ½ page were left for supplement).	1
Dry bulb thermograph	½
Wet „ „	½
Rainfall	½
Sunshine	½
Velocity and direction of wind	1
	4

(There being an even number of pages the same table would always occur in the same position in the volume when opened, which would facilitate reference.)

Each observatory would thus occupy 48 pages in the year, and the four observatories 144 pages.

It is difficult I think to have anything to do with foreign records without realising the confusion and waste of time due to the differences of the units employed; and our present employment of feet and inches and the Fahrenheit scale of temperature should be given up unless its continuation can be justified.¶ I do not expect that our "Hourly Readings" is read by many besides those to whom the C. G. S. units are familiar; nor is it likely that, as this annual volume is produced in a separate branch of the office, there would be any serious confusion between its readings and those in English units used by the forecasting branch. The latter branch must, I presume, maintain its present old units until the public for whom its work is done is better educated.

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* See the Austrian volume for 1897, page C. 15, for an example.

† "Studies in the Statics and Dynamics of the Atmosphere in the United States" (Monthly Weather Review, 1902), pages 9, 10.

‡ See, for example, "Hourly Means," 1898, p. 139.

§ Potsdam, 1893, pp. 76–81. A similar method was adopted by the Council in the publication O. 56.

‖ See, for example, a paper on the "Hourly Variation of Sunshine" in the Quarterly Journal of the Meteorological Society, Vol. XXI., 1895.

¶ Out of all the stations whose hourly readings are contained in the fifteen volumes enumerated above, only three stations (Toronto, New York, and Hong Kong) give their results in English units.

As regards the convenience of the size of a division in the different units I imagine that the present units are better for some instruments, and the C. G. S. units for others; but by publishing only even numbers in the last decimal place, or only multiples of 5, much might be done towards giving any desired degree of precision in the printing of results.*

B.—*The Checking of Results.*

In connexion with the verification of the readings and calculations, the pressure of work occurs at the Meteorological Office rather than at the separate observatories, and there is no special reason for diminishing the quantity of work to be done at these places. All the calculations are performed there, and only a small percentage of their work is verified at headquarters; it does not seem to me, therefore, that our revision could safely be reduced except in one respect. The corrections to barograph readings, obtained by comparison with the standard barometers,† are entirely re-calculated and applied here, and there appears to be no special reason why the verification in this case should not be on the usual lines; I consider that we should re-calculate merely a fraction of the readings.

540. *Weekly Weather Report.*—It was resolved to include a map showing districts and stations as a frontispiece in the annual volume of the Weekly Weather Report.

541. *Logs.*—Six received, one excellent (Capt. A. Simpson).

542. *Storm Warnings:*—

Signals hoisted on 8 days, total number of districts warned, 44.

In 19 districts the warnings were justified by subsequent gales (force 8 and upwards), and in 18 districts by strong winds (force 7 or 6). In 7 districts they were not required.

Gales experienced for which no warnings were issued.—None.

FREDC. GASTER.

Forecasting Branch,
27th January, 1903.

543. *Accounts.*—Submitted—The following Statement of Accounts:—

	£	*s.*	*d.*
Cash balance on 13th January	6,333	13	1
Receipts from 14th to 26th January	22	2	5
	6,355	15	6
Cheques drawn from 14th to 26th January	75	5	2
Cash balance on 26th January	£6,280	10	4

544. *Library.*—List of publications received since the last meeting:—

Agram, Meteorologisches Observatorium.—Jahrbuch, 1901. Jahrg. 1.

Berlin, Königlich Preussisches Meteorologisches Institut.—Ergebnisse der meteorologischen Beobachtungen in Potsdam. 1900.

Bolton, C. Perceval.—Waterford weather report. 1902.

British New Guinea.—Annual report on British New Guinea. 1900–1901.

Hellmann, G.—Regenkarte der Provinz Westfalen sowie von Waldeck, Schaumburg-Lippe, Lippe-Detmold und dem Kreis Rinteln.

Hopkinson, John.—The floods of November, 1894, in Hertfordshire.

—— —— On the recent discovery of silurian rocks in Hertfordshire, and their relation to the water-bearing strata of the London basin.

—— —— The gale of the 24th March, 1895, in Hertfordshire.

—— —— The rainfall of the northern counties of England.

—— —— Temperature and rainfall at Hitchin, 1850–87.

* For example, instead of giving barometric pressures to ·001 of an inch, which may I think be rather beyond the limit of accuracy attainable by our instruments, we might publish to ·05 of a millimeter.

† I may, perhaps, remark that an appreciable improvement in the accuracy of the barometer readings might be effected if the standard barometer were read more frequently. A correction comparable with ·004 is applied to the whole of a day's readings, and is often based on five standard readings: these usually differ among themselves and are by no means uniformly distributed over the 24 hours in which they occur. Thus, between 6 p.m. and 10 a.m. there may be no standard reading taken.

Lamb, Edmund.—Climatological observations, taken at Borden Wood, in the parish of Chithurst, County of Sussex, during the year 1902.

Lloyd's Calendar.—1903.

London, Admiralty, Hydrographic Department.—Catalogue of Admiralty charts, plans, and sailing directions. 1903.

* *London, Royal Society.*—International catalogue of scientific literature. First annual issue. E. Astronomy. R. Bacteriology. 2 vols.

Washington. Smithsonian Institution.—Annual report of the Board of Regents . . . for the year ending June 30th, 1901.

63, *Victoria Street, S.W.*, 11*th February*, 1903.

PRESENT :

SIR R. STRACHEY, IN THE CHAIR.

PROFESSOR DARWIN. | THE HYDROGRAPHER.

MR. SHAW (*Secretary*).

545. The Minutes of the last meeting (27th January) were read and confirmed.

546. *Government Inquiry.*—Reported—that the Chairman and Secretary had attended on Tuesday, 3rd February, in accordance with the request of Sir H. Maxwell (Minute 531), to give evidence before the Committee and that the Secretary had also attended on Friday, 6th February. Reported—also that members of the Committee had expressed a wish for the following returns :—(1) Payments to members of the Council. (2) List of Stations arranged according to the chief political divisions of the United Kingdom showing the amount, if any, paid for observations from the stations. (3) Memorandum upon the arrangements of the work of the Office in view of the recommendations of the Committee of 1866 and those of the Committee of 1875 ; also that the returns numbered (1) and (2) had been prepared and handed in by the Secretary.

The Secretary's action was approved and he was directed to prepare the return numbered (3).

547. *National Physical Laboratory* (Minutes 446, 449, 461).—Read—the following letter and enclosure :—

M.O. 472. (Enclosure.)

Burlington House, London, W.,
2nd February, 1903.

DEAR SIR,

I AM directed by the President and Council of the Royal Society to forward, for your information, the enclosed copy of a resolution, passed by a Committee appointed by the Council in December last, to confer and report to the Royal Society with regard to the administration and organisation of the new Magnetical Observatory proposed to be established under the direction of the National Physical Laboratory.

I am, &c.,
ROBT. HARRISON,
Assistant Secretary, R.S.

The Secretary to the
Meteorological Council.

"The Committee report that, in their opinion, the work of the new Magnetic Observatory should, as soon as funds become available, be extended to include experimental investigations in atmospheric electricity and other subjects related to meteorology, and that this extension should be kept in view in the first organisation of the Observatory."

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* Purchased.

548. *Colonial and Foreign Stations: Hints for Observers* (Minutes 408, 499).—Read—the following letter :—

M.O. 276.

Foreign Office,
2nd February, 1903.

SIR,

THE Marquess of Lansdowne caused your letter of the 25th ult. to be referred to the Intelligence Division of the War Office, and I am directed by His Lordship to transmit to you a copy of the reply that has been received from Sir W. Nicholson relative to the question of the recording of lake levels in the Uganda Protectorate.

I am to inquire whether this Department can be of any further assistance in dealing with this matter.

I am, &c.,
CLEMENT LL. HILL.

The Secretary to the
Meteorological Office.

Intelligence Division, Winchester House,
St. James's Square, S.W.,
28th January, 1903.

THE Director-General of Mobilisation and Military Intelligence presents his compliments to the Superintendent of African Protectorates, and in reply to Sir Clement Hill's note of the 20th inst., relative to the question of the recording of lake levels in the Uganda Protectorate, begs to offer the following remarks :—

Sir William Nicholson has no criticisms to offer upon the proposed methods of observation, but he would point out that the systematic record of the levels of all the lakes draining into the Nile is of the utmost importance to the Irrigation Department of Egypt, and he would suggest that, if the matter were referred to them, they might be in a position to supply a set of self-recording gauges of the most approved pattern, and to give full instructions for their erection and use. He may further mention that he was asked, only a few days ago, by the Director of the Egyptian Survey Department, for a copy of the existing records of the Victoria Nyanza levels, and he would be obliged if he could be supplied with a transcription of these for transmission to Egypt.

549. *Instruments—Kikuyu, British East Africa* (Minute 498).—Read—the following letter :—

M.O. 320.

Foreign Office,
6th February, 1903.

SIR,

WITH reference to your letter (M.O. 2,389) of the 23rd ult. respecting meteorological observations at Kikuyu, I am directed by the Marquess of Lansdowne to transmit to you the accompanying copy of a despatch from His Majesty's Commissioner for the East Africa Protectorate on the general question of meteorological instruments and returns in the whole Protectorate.

The instruments required by Sir C. Eliot were ordered and will shortly be despatched by the Crown Agents for the Colonies ; so, in view of the fact that there will be two complete sets of meteorological instruments in the Protectorate, and of the proposals set forth in Sir C. Eliot's enclosed despatch, I am directed to enquire whether the Meteorological Council are of opinion that it is necessary that a third set should be supplied.

I am, &c.,
CLEMENT LL. HILL.

The Secretary to the
Meteorological Office.

MEMORANDUM ENCLOSED IN SIR C. ELIOT'S DESPATCH (M.O. 133).

Mombasa,
4th April, 1902.

SIR,

I HAVE the honour to acknowledge the receipt of your despatch of 5th ult. concerning the meteorological observations to be made in this Protectorate, and to make the following suggestions for your approval :—

1. Mr. Ravenstein wishes that observations should be taken three times a day at as many places as possible, and he mentions Mombasa, Kikuyu, and Kavirondo, as being desirable situations for this purpose. I hope to be able to establish two stations, at any rate, where this will be done, as soon as the necessary instruments are available.

2. But at these stations, and also at those others where observations are made only once a day, it will be necessary that some one else besides the regular observer should be able to record the readings of the instruments, so that during the temporary absence of the regular observer the record may be maintained in its continuity. This could be effected by the observer at each station training someone on whom this occasional duty might devolve.

3. Climatological stations, or those at which observations are made once a day, may be established at Lamu, Kismayu, and wherever, in the future, Mr. Reddie and Mr. Hinde may reside.

4. At certain other stations the rainfall only need be noted.

5. The instruments in the Proctectorate at present are sufficient for the equipment of only two stations, because, although there are more than two stations supplied with instruments, there are only two sets of the more essential instruments.

6. There are certain of the instruments reported to be out of order, and others broken. Those which cannot be put right out here, I suggest should be sent to England for repair.

7. I should, therefore be glad if you would kindly cause the following instruments and papers to be supplied me for distribution :—

1 Fortin's barometer.
2 Barographs.
2 Thermographs.
8 Maximum thermometers.
8 Minimum thermometers.
6 Rain gauges and measure glasses.
12 Copies of "Hints to Meteorological Observers in Tropical Africa."
200 Copies of "Registers of Observations."

I understand that the "Hints" and "Registers" are supplied gratis by the Meteorological Committee of the British Association.

8. I have taken over the instruments which were in Mombasa, and am taking the observations. I am also in correspondence with various gentlemen with a view to the re-arrangement of the instruments.

I have, &c.,
J. T. C. JOHNSON.

Sir Charles Eliot, K.C.M.G., C.B., &c.

The Secretary was directed to draft a reply.

550. *Antarctic Co-operation* (Minutes 9, 47, and M.O. 1,125/01, P.C. 1,686/01).—Read—the following letter :—

M.O. 354.

Foreign Office,
9th February, 1903.

SIR,

WITH reference to the letter from this Office of 12th July, 1901, and to your reply of 25th July of that year, I am directed by the Marquess of Lansdowne to transmit to you herewith a copy of a Note from the German Ambassador stating that in view of the amount of material in the form of observations which will be brought together consequent on the international combined work in Terrestrial Magnetism and Meteorology during the South Polar investigations in the years 1902-1903, it appears desirable that a tabulated statement of results should be made of the observations taken at the various places in the individual co-operating States, before the combined compilation of the international material takes place. I am to enquire whether the Meteorological Council are disposed to entertain favourably the proposals contained in Count Metternich's Note, and will take the necessary steps to comply with them.

I am, &c.,
T. H. SANDERSON.

The Secretary to the
Meteorological Office.

(Translation.)

German Embassy, London,
31st January, 1903.

MY LORD,

IN view of the amount of material, in the form of observations, which will be brought together consequent on the international combined work in Terrestrial Magnetism and Meteorology during the South Polar investigations in the years 1902-1903, it appears desirable that a tabulated statement of results should be made of the observations taken at the various places in the individual co-operating States, before the combined compilation of the international material takes place.

I have the honour to request Your Excellency, in accordance with instructions from my Government, to be good enough to cause the observations in Terrestrial Magnetism and Meteorology made at the institutions of the United Kingdom and British possessions abroad, to be duly tabulated, and all the records of the observations, together with the tabular summary, to be subsequently communicated to this Embassy.

I venture to request Your Excellency to kindly second the request of the German Government with the proper authorities.

I have, &c.,
P. METTERNICH.

The Marquess of Lansdowne, K.G., &c.

551. *Wireless Telegraphy.*—The Secretary reported that he had consulted Colonel Hozier, C.B., Secretary of Lloyd's, with a view to arranging for messages to be obtained by means of wireless telegraphy from steamers of the Atlantic Lines passing north and south of Ireland for use in the Daily Weather Reports, and that Colonel Hozier had expressed the opinion that it would be possible to make a temporary arrangement on trial for messages to be received at Brow Head and Innishtrahull.

The Secretary was directed to report further upon the matter.

552. *Colonial and Foreign Observations—Imperial Institute.*—Read—letter 315 from the Director of the Imperial Institute asking for advice as to the re-publication of an

abstract of results for temperature and rainfall and other meteorological statistics for a number of Colonies, which appear in a Statistical Abstract relating to Colonies issued by the Board of Trade.

The Secretary was directed to write in reply stating that the Council were considering the publication of a periodical return of observations in the Colonies and Dependencies, and giving information as to the forms for summaries of meteorological observations in general use.

553. *Instruments.*—Read—letter 228 from the Hydrographer requesting an increase in the establishment of instruments at Haulbowline, and asking for the stock to be made up as soon as possible to the new establishment.

The Secretary reported that he had had the stock made up as requested.

It was agreed that the establishment be increased as requested and the Secretary's action was approved.

554. *Instruments—British New Guinea* (Minute 3 of 26th February, 1901).—Submitted—the following letter and enclosures : —

M.O. 226.

Queensland Government Office,
London, S.W.,
27th January, 1903.

SIR,

I AM directed to forward enclosed herewith, a copy of a letter received from the Government Secretary's Department, Port Moresby, British New Guinea (with its 5 enclosures and a map) having reference to several meteorological instruments which you were good enough to lend to the British New Guinea Government.

I am, &c.,
J. M. GRANT,
Chief Clerk.

The Secretary,
Meteorological Office,
63, Victoria Street, S.W.

Government Secretary's Department,
Port Moresby, B.N.G.,
24th November, 1902.

SIR,

I HAVE the honour to enclose herewith, copy of a letter from the Chief Government Surveyor as to the action taken in his department with regard to the distribution of the several meteorological instruments which the Meteorological Office were good enough to lend to this Government, accompanying this also are receipts for four out of the six sets on loan and a map supplied at my request to show the several meteorological stations. Will you be so good, at your convenience, as to cause the enclosures to be sent to the Secretary of the above Office for his information.

2. Some tables of observations are being published in our British New Guinea Gazette, as from the 1st July last, but I regret the delay involved in starting these new records and I may perhaps note that this Department had ceased to be responsible for all such observations for some months prior to the receipt of the above valuable instruments in June 1901.

I have, &c.,
A. MUSGRAVE,
Government Secretary.

The Agent General for Queensland,
1, Victoria Street, London.

Department of Lands and Survey,
Port Moresby, B.N.G.,
26th October, 1902.

SIR,

I HAVE the honour to report herewith in reference to meteorological instruments and observations. Six cases of instruments were received from the London Meteorological Office of England in June, 1901. The whole matter of dealing with meteorological instruments and observations was placed in my charge by the Chief Government Surveyor.

Owing to pressure of other urgent work and unfavourable conditions I was not able to do anything with the instruments until the new Lands Office was established and in the meantime various directions were given with reference to the distribution of the instruments. As soon as possible I made enquiries as to suitable persons to take charge of the instruments, and had considerable difficulty in obtaining what was required. The cases of instruments are now distributed in the following order :—

Case 1.—Head Office, Port Moresby. Observer, J. Richmond, regular readings at 9 a.m. commenced 1st July, 1902. Temperature of sea water is also taken every morning.

Case 2.—Samarai. Up to the present I have not heard from Samarai as to proceedings in the matter.

Case 3.—Daru. Observer, G. M. Robertson, whose observations are enclosed herewith together with a photograph of the shed. This station has been directed to observe at 9 a.m., so that they may correspond with other stations throughout B.N.G.

Case 4.—Aruapaka, Yule Island. Observer, E. S. Tooth, from whom not any returns have yet been received.

Case 5.—Sogeri. Observer, A. S. Anthony, manager of Mr. Ballantine's coffee plantation, who commenced recording on 1st July, 1902. This is a valuable station, being the most elevated position that we have instruments placed at, but its height above sea level has not yet been determined, I propose fixing this station both by hypsometric and by trigonometrical observations as soon as possible, the position will be determined astronomically also at the earliest opportunity.

Case 6.—Tamata. Observer, the Rev. Copland King, this set is now on the way.

Every effort is being made to obtain results which will be of use to the Society, Stevenson screens and sheds of the pattern given are used in all stations and I would ask that any directions or notes on the work done may be sent to me for guidance.

Any special observations for scientific purposes which may be required, I am willing to do if the instruments and full directions are sent.

I have, &c.,
J. RICHMOND,
Chief Government Surveyor.

The Honorable
The Government Secretary.

555. *Publications—Hourly Means* (Minute 539).—The Secretary was directed to obtain specimens of printing of the various tables required for a volume of hourly readings in British Units in general accordance with the suggestions in Mr. Walker's report.

556. *Anemometer Records—Equivalents of Beaufort Scale.*—With reference to the table of equivalents in Minute 419 which is reproduced in the *Hints to Observers in Tropical Africa*, the Secretary reported that at his request Mr. G. T. Walker had looked into the question of the method of estimating the equivalents and had reported (M.O. 404) that in order to obtain satisfactory results it was necessary, as suggested by Köppen, to take the means of the Beaufort estimates of velocities within a certain range, and not the means of hourly velocity values corresponding to the several Beaufort numbers; that the differences introduced by the first method would amount to 1 mile per hour at force 1, 6 miles per hour at force 8, and 12 miles per hour at force 11 for a certain comparison, while it would not affect the equivalents of forces 3 to 7.

It was resolved that reference be made to the data used by Mr. R. H. Curtis in computing the table of equivalents so that the basis of comparison might be understood.

557. *Anemograph Stations—Yarmouth.*—The Secretary reported that as Mr. Watson was unable to replace the anemometer after its repair, he had directed Mr. R. H. Curtis to go to Yarmouth and remount the instrument and that Mr. Curtis had since reported the instrument as being left in good order and working satisfactorily. (M.O. 1,428/02.)

558. *Observatories—Kew Electrograms.*—The Secretary reported that he had authorized Dr. Chree to make use of tabulations of the electrograms in the report of the National Physical Laboratory for 1902.

Approved.

559. *Logs.*—Seven received, one excellent (Captain Angus); also two short logs and three lighthouse registers.

560. *Storm Warnings:—*

The signals were hoisted on 12 days; the total number of districts warned, being 58.

In 30 districts the warnings were justified by subsequent gales (force 8 and upwards), and in 18 districts by subsequent strong winds (force 7 or 6). In 10 districts they were not required.

Gales experienced, for which no Warnings were Issued.—None.

561. *Reports of Work for January*, 1903:—

MARINE BRANCH.

January, 1903.

Examined 14 new meteorological logs, two short meteorological logs, and three lighthouse registers.

Discussion South of Equator, between the West Coast of Africa and 90° W. longitude. Preparing ocean charts for engraving and publication.

Indian Ocean District—from latitude 30° N. to 30° S. Preparing and extracting data in office logs.

Monthly Pilot Chart of the North Atlantic and Mediterranean.—February, 1903, proofs examined and passed for press. March chart sent to the lithographer, and progress made with the preparation of the April chart. Charting sea temperatures for November and December, 1902, and January, 1903; also charting pressure observations and obtaining tracks of storms for November and December, 1902. Registering and acknowledging reports of sea temperature, barometer, &c., and issuing charts and fresh supplies of forms. One hundred and thirty reports containing observations to be used for the charts received during the month.

Charts showing the surface temperature of the Atlantic, Indian, and Pacific Oceans. Reduction of charts by photo-lithography for re-issue of official publication No. 59 examined and sent for revise.

Sailing Directions for China Sea.—Obtaining meteorological results at several stations for new issue by Admiralty.

Hydrographic extracts from logs of P. and O. SS. "India" and "Arcadia" relative to refraction, &c., in Red Sea sent to Admiralty.

Wind results for May to August, 1902, copied from Atlantic weather forms for Mr. H. N. Dickson.

CAMPBELL HEPWORTH.

MONTHLY RETURN OF "A" AND "M.O." INSTRUMENTS.

January, 1903.

—	Barometers.	Aneroids.	Thermometers.					Screens.	Hydrometers.	Rain Gauges.	Anemometers.	Storm Cones.	Sunshine Recorders.	Glass Spheres.	Miscellaneous.
			Ordinary.	Maximum.	Minimum.	Solar Radiation.	Terr. Radiation.								
"A" ACCOUNT.															
Dr.															
On charge, 1st Jan., 1903	62	148	280	120	135	—	—	34	29	2	—	—	—	—	
Received since	22	20	21	5	3	—	—	20	—	—	—	—	—	—	
	84	168	301	125	138	—	—	54	29	2	—	—	—	—	
Cr.															
Sent out during month...	22	33	84	8	6	—	—	9	20	—	—	—	—	—	
On charge, 1st Feb., 1903	62	135	217	117	132	—	—	45	9	2	—	—	—	—	
"M.O." ACCOUNT.															
Dr.															
On charge, 1st Jan., 1903	22	3	33	9	3	2	6	—	—	8	1	5	1	1	
Received since	4	—	8	—	—	—	—	5	103	—	—	—	—	6	
	26	3	41	9	3	2	6	5	103	8	1	5	1	7	
Cr.															
Sent out during month...	10	1	33	—	—	1	—	5	25	—	—	—	1	1	
On charge, 1st Feb., 1903	16	2	8	9	3	1	6	—	78	8	1	5	—	6	

10th February, 1903.

R. F. WALLACE.

OBSERVATORY BRANCH.

Daily Means.—A commencement has been made with the calculation of the values for 1900. The mean values for Kew, required for the report of the Nat. Physical Laboratory for 1902, have been completed, and together with mean values for 30 years forwarded to Kew Observatory.

Examination Work.—This is practically up to date with the exception of the remeasurements made in the Forecast Branch, which have been suspended whilst the tabulation of the anemograms for 1902 is being done.

Miscellaneous.—(1.) Examination of Falmouth pressure-tube anemograms.

(2.) Enquiry into working of sunshine recorder at Port Talbot.

(3.) Comparison of readings of Dine's barograph with standard barometer.

(4.) Ben Nevis observations copied for Prof. Hergesell.

(5.) Yarmouth anemometer examined after repair, and re-erected at Yarmouth.

(6.) Enquiry as to accuracy of Falmouth and Scilly barometer readings.

(7.) Report upon prevalence of easterly winds upon the coast of Norfolk, for the Board of Trade.

Assistance from the Forecast Branch.—During the month remeasurements of barograms and thermograms, and comparison of standard and tabulated readings, have been made for Aberdeen,

Fort William, and Falmouth Observatories for November; and, as regards thermograms only, for Fort William and Falmouth for March, 1902. Anemograms have been tabulated for Deerness, October to December; Fleetwood, August to October; and Yarmouth, April to November, 1902; in all 14 months.

R. H. CURTIS.

STATISTICAL AND LIBRARY BRANCH.

1. Issue of Publications :—

Daily and weekly publications regularly issued.

Pilot Charts for February, 1903, received, and 266 copies issued ; also 180 copies of charts for previous months issued to Captains of ships and others.

Presentation copies of publications, 77 in all, issued to Captains and Officers of ships and others.

2. Statistical and Station Work :—

Tables for the weekly issues of the "Weekly Weather Report" prepared to date, and carried through the press.

Tables and Maps Nos. 1, 3, and 4 for the Monthly Summary of the "Weekly Weather Report" for December, 1902, prepared and carried through the press.

Quarterly Summary of the "Weekly Weather Report" for the fourth quarter of 1902 completed and passed through the press.

Annual Summary of the "Weekly Weather Report" for 1902, completing Appendix I., prepared and sent to the printer.

Appendix II. of the "Weekly Weather Report" for 1902, showing weekly and progressive values of the various elements, prepared and sent to the printer.

Ten-day Means of observations at five British Stations prepared and regularly supplied to Dr. Neumayer, Hamburg.

Results of daily observations of temperature and rainfall prepared and regularly supplied to the Registrars General for their Weekly Returns, viz., for—

England and Wales from	14 Stations.
Ireland from	6 Stations.

Monthly and quarterly results of complete observations prepared and supplied to the Registrars General for their Quarterly Returns, viz., for—

England and Wales from	28 Stations.
Ireland from	8 Stations.

"Returns from Stations of the Second Order" for 1899 completed and the volume passed for press.

Index to annual report, 1901–2, prepared and sent to the printer.

Summaries on International Form B of the observations taken at York, St. Leonards, and Eastbourne during 1902, prepared and forwarded to the observers for local publication.

Daily amounts of sunshine at Bunhill Row for the fourth quarter of 1902 prepared for the Royal Meteorological Society.

3. Library :—

Accessions to Library received, press marked, and catalogued on cards.

Eight-eight volumes of publications received from the binders, examined, press marked, and arranged on shelves.

4. Inquiries :—

Eighty inquiries were dealt with during January. Twenty-two of these were by letter, but in 58 cases personal application was made. In 10 cases of personal application payment was made for the preparation of the information supplied.

5. General :—

Mr. Bracey rendered assistance in Forecast Branch on two days.

JOHN A. CURTIS.

562. *Accounts.*—Submitted—the following statement of accounts :—

	£	s.	d.
Cash balance on 26th January	6,280	10	4
Receipts from 27th January to 10th February ...	275	12	8
	6,556	3	0
Cheques drawn from 27th January to 10th February	1,021	13	7
Cash balance on 10th February	£5,534	9	5

563. *Forecasts.*—Report on the Forecasts issued at 8.30 p.m. daily during the month of January, 1903 :—

The letters used have the following signification :—
a = complete success. | c = partial failure.
b = partial (*i.e.*, more than half) success. | d = total failure.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success. a + b.
Scotland, N.	a	42	52	47	83
,,	b	49	22	36	
,,	c	6	26	16	
,,	d	3	0	1	
Scotland, E.	a	49	55	52	83
,,	b	29	32	31	
,,	c	19	13	16	
,,	d	3	0	1	
England, N.E.	a	52	55	54	99
,,	b	48	32	45	
,,	c	0	3	1	
,,	d	0	0	0	
England, E.	a	68	35	52	91
,,	b	26	52	39	
,,	c	6	13	9	
,,	d	0	0	0	
Midland Counties	a	58	36	47	91
,,	b	39	48	44	
,,	c	3	16	9	
,,	d	0	0	0	
England, S.	a	65	35	50	92
,,	b	32	52	42	
,,	c	3	13	8	
,,	d	0	0	0	
Scotland, W.	a	45	39	42	81
,,	b	36	42	39	
,,	c	16	19	18	
,,	d	3	0	1	
England, N.W.	a	55	42	49	89
,,	b	39	42	40	
,,	c	3	16	10	
,,	d	3	0	1	
England, S.W.	a	58	52	55	86
,,	b	32	29	31	
,,	c	10	19	14	
,,	d	0	0	0	
Ireland, N.	a	45	65	55	76
,,	b	29	13	21	
,,	c	20	22	21	
,,	d	6	0	3	
Ireland, S.	a	52	65	59	80
,,	b	29	13	21	
,,	c	19	22	20	
,,	d	0	0	0	
Summary.					
British Islands	a	54	48	51	86
,,	b	35	35	35	
,,	c	9	17	13	
,,	d	2	0	1	

564. *Library.*—List of publications received since the last meeting :—

Bahamas.—Report for 1901–2. Colonial reports, annual.

Bénard, C.—Les courants de l'Atlantique Nord et du golfe de Gascogne.

British Honduras.—Report for 1901. Colonial reports, annual, No. 362.

—— *Solomon Islands.*—Report for 1901–1902. Colonial reports, annual, No. 372.

Devon.—Report of the Committee on the climate of Devon. Edited by A. Chandler and W. Ingham. 6th and 20th, 3rd series, 1887 and 1901.

Hamburg, Deutsche Seewarte.—Deutsches meteorologisches Jahrbuch für 1901. Beobachtungs—system der Deutschen Seewarte. Ergebnisse der meteorologischen Beobachtungen . . . Jahrg. 24.

Jamaica.—Report for 1901-1902. Colonial reports, annual, No. 373.

Malta.—Report for 1901. Colonial reports, annual, No. 358.

Manchester, Great Central Railway.—Monthly statement of rain fallen in the year ending 31st December, 1902.

Mellish, H.—The weather of 1902, at Hodsock Priory, Worksop.

St. Petersburg, Central Hydrographical Department.—Meteorological observations made in the year 1900 at the mouth of the Pechora by the Expedition of the North Frozen Ocean. Under the command of Captain Sergieff.

—— *Observatoire Physique Central Nicolas.*—Annales . . . publiées, par M. Rykatchew. 1900, Parties i.–ii. 2 vols.

Seychelles.—Report for 1901. Colonial reports, annual, No. 364.

Vienna, K. K. Sternwarte.—Meteorologische Beobachtungen auf der K. K. Sternwarte in den Jahren, 1897–1900.

Washington Department of Agriculture Weather Bureau.—Report of the Chief of the Weather Bureau, 1901–1902.

—— *Treasury Department, U.S. Coast and Geodetic Survey.*—United States magnetic declination tables and isogonic charts for 1902 and principal facts relating to the earth's magnetism, by L. A. Bauer.

63, *Victoria Street, S.W., 27th February*, 1903.

PRESENT :

PROFESSOR DARWIN, IN THE CHAIR.

THE HYDROGRAPHER. | MR. SHAW (*Secretary*).

565. The Minutes of the last meeting (11th February) were read and confirmed.

566. *London Fog Inquiry* (Minutes 407, 432).—Read—The following letter :—

M.O. 482.

LONDON FOG INQUIRY.

County Hall, Spring Gardens, S.W.,
24th February, 1903.

DEAR SIR,

I AM obliged for your message of yesterday asking for the number of copies of Captain Carpenter's report desired by the Council. I shall be much obliged if you will be good enough to send me 25 copies.

I am sorry to tell you that the General Purposes Committee, at their meeting yesterday, decided to recommend the Council not to make any further grant towards the expenses of the continuance of the inquiry. The Committee will report to the Council on Tuesday next, the 3rd prox., and I will let you know as soon as possible the decision of the Council in the matter.

I am, &c.,
G. C. GOMME,
Clerk of the Council.

The Secretary,
Meteorological Office.

The Secretary was directed to forward the 25 copies of the Report as requested, and to say that the Council awaited the decision of the County Council upon the recommendation of the General Purposes Committee.

567. *Antarctic Co-operation* (Minute 550).—Read—The following letter and enclosure :—

M.O. 479.

Foreign Office,
24th February, 1903.

SIR,

WITH reference to the letter from this Office of the 9th inst., enclosing copy of a Note from the German Ambassador, suggesting that the observations in Magnetism and Meteorology made in this country and in British possessions abroad should be tabulated before being communicated to the German Embassy, I am directed by the Marquess of Lansdowne to transmit to you herewith a copy of a letter from the Colonial Office pointing out that the preparation of a tabulated statement of results, so far as the Colonies are concerned, is hardly within the competence of that Department.

It is suggested that your Office might be willing to carry out this tabulation on being furnished by the German Embassy with the exact particulars of the methods of comparison required.

Lord Lansdowne would be glad to know whether the Meteorological Council would feel disposed to undertake this task.

The Secretary of State for the Colonies has been informed with reference to the final paragraph of the accompanying letter, that the period for taking observations, as stated in one of the enclosures in Count Hatzfeldt's Note of July 10th, 1901, was to be between 1st October, 1901, and 31st March, 1903.

I am, &c.,
T. H. SANDERSON.

The Secretary to the
Meteorological Office.

Downing Street,
19th February, 1903.

SIR,

I AM directed to acknowledge the receipt of your letter of the 9th inst., transmitting a copy of a Note from the German Ambassador, suggesting that the observations in Magnetism and Meteorology made in this country and in British possessions abroad should be tabulated before communication to the German Embassy.

2. The arrangements made for securing these observations, so far as the Colonies are concerned, have already been made known to the Marquess of Lansdowne by the letter from this Office of the 8th of October last, and previous correspondence ; and I am to request you to point out to his Lordship that, while copies of the records made can, no doubt, be procured from the co-operating Governments and individuals concerned, though none have as yet reached this Department, the preparation of a tabulated statement of results is hardly within the competence of this Department.

3. It is suggested, therefore, that the Meteorological Office might be asked to undertake the tabulation of these observations, if it were understood that the German Embassy would supply exact particulars of the methods of comparison required.

4. This Department is not aware of the date at which the taking of observations is to cease, the programmes enclosed in your letter of 12th July, 1901, having all been distributed to the Colonies concerned ; but, if this were ascertained, a circular could be sent to the Colonies concerned asking that the records may be sent to this country as soon as possible after such date.

I am, &c.,
H. BERTRAM COX.

The Under Secretary of State,
Foreign Office.

The Secretary was directed to write to the Foreign Office and explain that magnetic observations do not come within the scope of the operations of the Office ; that the question of tabulating the meteorological registers from ships, and from British stations in connexion with the Antarctic Expeditions must be considered in relation to the mode of dealing with the records of the British Expedition ; that as soon as the Council had sufficient information to express an effective opinion upon the course to be adopted, they would communicate again with the Foreign Office.

568. *Colonial and Foreign Observations, Cape Pembroke* (Minute 418).—Read—Letter 455 fromMr. W. S. Bruce, Leader of the Scottish Antarctic Expedition, enclosing the report of an inspection of the meteorological instruments at the Falkland Isles.

M.O. 455.

Antarctic Ship, "Scotia,"
Port Stanley Harbour,
Falkland Islands,
24th January, 1903.

DEAR SIR,

I INSPECTED Cape Pembroke Lighthouse on 12th January, in conjunction with Mr. Mossman, and herewith enclose our joint report. You will see from it that we have added to the stock of instruments. We have also lent a barograph, and if the Meteorological Council wish it left permanently you might kindly let me know.

The sunshine recorder (M.O. 102) has been left with His Excellency the Governor, W. Guy-Wilson, Esq., C.M.G., who has undertaken to keep the record. A suitable site has been found for it contiguous to Government House. The position is a good one, and there is little to interrupt the trace, the only possibility being towards evening in summer, when some distant hills might intercept the trace for three-quarters of an hour before sunset. Please send Mr. Guy-Wilson the pamphlet giving "Instructions in the use and adjustment of the Campbell-Stokes recorder." Kindly alter the dates fixed for the insertion of the cards so as to suit the southern hemisphere. I have done so

approximately, but it is probable that there may be a slight error in those given. The instrument left having Mr. Curtis's recent improvement, it might be desirable to send him the paper which appeared in the Quarterly Journal of the Royal Meteorological Society bearing on the subject. The recorder was in perfect adjustment when delivered. This instrument, being one of those lent to the Expedition by the Meteorological Council, cannot be left permanently unless I receive authority to do so.

The Meteorological Council might, perhaps, see their way to furnish a complete set of instruments for Port Stanley, the Governor is much interested in the work, and, if approached, might possibly see that the instruments were taken care of and a record kept. There is at present no meteorological station, or even a rainfall record. Had we taken a spare rain gauge I should certainly have left it, owing to the interest attaching to such a register during our work in the far South. As we shall be away for over a year, we could not personally superintend the establishment of the station until next year, but there is little doubt that the instruments, if sent in the interval, would be well looked after and observations made. I contemplate returning here about February or March of next year, when we shall again visit Cape Pembroke Lighthouse.

I am, &c.,

WM. S. BRUCE,
Leader of Scottish Antarctic Expedition.

The Secretary,
Meteorological Office.

Antarctic Ship, "Scotia,"
Stanley, Falklands,
20th January, 1903.

M.O. 1893 (3 enclosures) :—

I. Receipt from Mr. Pearce for M.O. consignment.

II. Kew Certificate for maximum thermometer, 620,314.

III. Receipt from Mr. Charles Coulson for wall screen.

REPORT ON THE METEOROLOGICAL STATION AT CAPE PEMBROKE LIGHTHOUSE, FALKLAND ISLANDS.—By W. S. BRUCE, F.R.S.G.S., and R. C. MOSSMAN, F.R.S.E.

Introductory.—As requested in your favour of 15th October last, we inspected the meteorological station at Cape Pembroke on 12th January. We found the equipment generally in a worn-out condition, so that the apparatus sent out by the Meteorological Office was urgently required. Owing to unfavourable weather we could not go by boat, going on foot overland. For this reason the Stevenson screen has not yet been delivered ; but, as will be seen further on, special parts are required which could not have been made on the spot. The Governor of the Falkland Islands, William Guy-Wilson, Esq., C.M.G., has kindly undertaken to see this through. The following is a detailed report :—

Barometer.—The barometer is of the ordinary marine pattern, mounted on gymbals. It is placed in the second landing of the lighthouse tower. Its height above sea-level was determined by Mr. Bruce, the results giving 76 feet above sea-level by aneroid, and 80 feet by tape measure. Ten simultaneous readings of our barometer at Port Stanley Harbour and the Cape Pembroke one, gave a mean difference of minus 0·092 inch for height, after reducing both instruments to 32°, *and our own to sea-level.* From these synchronous readings, the instrumental correction of the lighthouse barometer may be approximately determined. In making the comparison, care was taken to select hours when the wind was light, so as to eliminate the disturbing effect of pumping during high winds. The observer, Mr. John Pearce, reads accurately. A small Richard barograph and supply of charts was left, Mr. Pearce having kindly agreed to keep this instrument at work during the Expedition's stay in the South.

Thermometers.—The wet bulb thermometer had been broken before the arrival of Mr. Pearce in March, 1902, and the dry bulb thermometer since. The wall screen for these instruments had fallen to pieces through age, and that for the maximum and minimum thermometers was in an almost equally dilapidated condition, several of the louvres being broken and fastened with string. The enclosed thermometers were by Negretti & Zambra, the number of the maximum (M.O. 51) was scratched on the wood just above the bulb ; the minimum was numbered 2,213. Both instruments were of an antique pattern, and the degrees were not engine-divided on the stem. The scales were of opal glass and the frames of wood. The minimum thermometer was seriously in error, the column of spirit being broken throughout 20 degrees, and the framework much warped. These instruments were brought away to be tested and, if possible, put right. After connecting the column of spirit, the minimum was found to have a large and variable error ranging from 2° to 4° at different temperatures. It had, therefore, to be condemned, and was retained by us for delivery to the Meteorological Office upon our return. The maximum was reading 0·8° too high at 60°. It was returned to the lighthouse to be used as a reserve instrument.

Mr. Bruce again visited Cape Pembroke on 13th January and left the following instruments (in addition to the two thermometers from the Meteorological Office delivered the day previous), namely, maximum thermometer, No. 620,314 (certificate enclosed herewith) ; minimum, No. 64,329A ; dry, No. 8,997,111 ; wet, No. 1,335,457, the latter being by Adie & Wedderburn, Edinburgh. The wet had K.O. 97 scratched on glass of thermometer, but the number on the dry was not noted These four thermometers belonged to Mr. Mossman, who gave them to complete, as far as possible, the meteorological equipment of the lighthouse. The instruments have all Kew certificates, but only that for the maximum is available. The approximate correction for the minimum may be obtained from Dr. Buchan's inspection of the Edinburgh (Blacket Place) station in October, 1900. The errors of the dry and wet were small, certainly not exceeding 0·2° at any part of the scale. All the instruments were engine-divided on the stem.

Screens.—Only one wall screen was left, as, of the two sent, one was used for expedition purposes. Two extra screens were, however, ordered from the Meteorological Office when the "Scotia" was at Madeira; one of these will be sent to Pembroke as soon as received to replace that kept. We were in favour of having all the instruments placed in the Stevenson screen. The new building is of galvanised iron, so that there is no favourable position for the wall screens owing to radiation. The old wooden building on which the old boxes are fixed is in a tumble-down condition, so there is great liability of the index of the minimum being shaken during strong winds. A site for the Stevenson was selected; owing to the loose, shifting sand, special posts 7 ft. 6 ins. long, covered with tin throughout half their length, are required. They will be buried in the sand to a depth of 3 ft. 9 ins. This is necessary, as, during a gale, the sand rolls about in waves which frequently forms such large drifts that doors and windows get blocked up, while other spots in the immediate vicinity are almost level. As before stated, the Governor, Mr. Guy-Wilson, C.M.G., has agreed to get the posts, &c., made for the screen and have it placed in position as soon as possible.

Rainfall.—There is no rain gauge at the station and there would probably be considerable difficulty in getting reliable observations, as the measurements would be vitiated during gales by the drifting sand. It might, however, be desirable that the station should have one to complete the equipment.

Anemometer.—There is no anemometer, but as the position is well suited for such an instrument one would be a useful addition to the equipment.

Staff.—Mr. John Pearce, the principal keeper of the lighthouse, is an eminently capable and painstaking observer. He was previously at the South Foreland Electric Lighthouse, near Dover, and has been connected with lighthouse work for 17 years. He has a good knowledge of meteorological work generally, except as regards cloud observations with which he was somewhat unfamiliar. We gave him as much information and advice as possible on this subject and, further, left with him a copy of the latest (1902? Ed.) of Mr. Marriott's "Hints to Observers" and Mr. H. N. Dickson's "Meteorology." A copy of Mr. R. H. Scott's book of instructions was at the station. Mr. Pearce would, no doubt, highly appreciate any Meteorological Reports the Office may see their way to send.

The assistant observer is Mr. Charles Coulson who, however, leaves for England in April. His capacity as an observer was tested and found satisfactory.

List of instruments at Pembroke Lighthouse :—

1 Marine barometer.
1 Richard barograph (lent by the Scottish National Antarctic Expedition).
2 Maximum thermometers (1 spare).
1 Minimum thermometer.
2 Sets dry and wet bulb thermometers (1 spare).
1 Stevenson screen.
2 Wall screens.

Addenda—24th February. [? January].

The wall screens ordered at Madeira arrived on 23rd January and the remaining screen was delivered to Mr. Coulson, whose receipt is enclosed.

It was ordered that the letter and report be printed in the Minutes.

569. *Colonial Observations.* — The Secretary reported an interview with Mr. F. R. Round, C.M.G., and correspondence (P.C. 256 and M.O. 292) with reference to Colonial Meteorological Summaries contained in Colonial Blue Books, and to circular despatches to the Colonies from the Secretary of State bearing upon the collection and publication of meteorological reports.

It was agreed to apply to the Stationery Office for copies of Colonial Blue Books, as issued in accordance with Mr. Chamberlain's circular despatch of 31st January, 1899.

570. *Instruments: Supply for the Transvaal.*—Read—Letter 430 from the Crown Agents for the Colonies inquiring if the Office would arrange for the supply, upon repayment, of the instruments in the Indent, Transvaal Requisition, No. 185.

The Secretary reported that, in acknowledging the letter, he had suggested (P.C. 470) that a note should be sent to the Colony making inquiries upon certain points respecting the specification, and that, pending a reply from the Colony, the instruments forming the equipment of ordinary meteorological stations in this country should be collected and made ready for despatch; that the Crown Agents had expressed concurrence in the suggestion (M.O. 481), and that he had prepared and forwarded a note to the Crown Agents for transmission to the Colony.

The Secretary's action was approved, and he was authorised to arrange for the supply of the instruments upon repayment in consultation with the Crown Agents.

571. *Accounts*—Submitted—The following Statement of Accounts for the nine months ending 31st December, 1902 :—

Receipts.	£ s. d.	£ s. d.	Payments.	£ s. d.	£ s. d.
Balance from year 1901-1902	—	2,464 19 7	Administration :		
Proportion of vote ...	—	10,500 0 0	Secretary	450 0 0	
Repayment of expenses charged under—			Salaries and wages ...	794 0 11	
(1.) Incidental expenses	22 12 5		Rent, fuel, and lighting	526 4 6	
(2.) Observatories ...	19 19 11		Incidental and contingent expenses ...	211 1 9	
(3.) Telegraphic Reports	2 0 0		Furniture and fittings	*308 17 6	
		44 12 4			2,290 4 8
Supply of Information :			Special Researches :		
Weather Forecasts, Reports, &c. ...	499 16 6		Salaries and other charges	—	576 17 1
Telegrams sent abroad	481 15 8		Land Meteorology :		
		981 12 2	Observatories and stations, including remuneration of observers	1,652 10 3	
Supply of Instruments, &c. :			Salaries :— Discussion and reduction of observations, &c. ...	1,348 17 4	
Repayment of cost of M.O. instruments purchased by observers	77 15 2		Weather Information and Forecasts :		3,001 7 7
Repayment of cost of other commissions...	187 4 1		Telegraphic reports and storm warnings, remuneration of observers, &c.	2,115 13 5	
		264 19 3	Salaries:—Preparation and issue of reports and forecasts ...	1,125 1 2	
Charges for Commission :			Inspections :		3,240 14 7
On supply of instruments, &c.	—	5 9 4	Salaries and travelling expenses	—	375 1 4
Superannuation Account :			Ocean Meteorology :		
Annuity	105 12 7		Salaries :— Discussion and reduction of observations... ...	1,041 4 10	
Interest on Investment	37 0 8		Expenses incidental to the supply of instruments :—		
		142 13 3	Proportion for care and issue of instruments	101 5 0	
			Royal Navy ...	347 8 5	
			Mercantile Marine...	347 13 8	
			Miscellaneous commissions executed for Colonial and Foreign institutions, &c. ...	—	1,837 11 11
			Superannuation :		208 2 1
			Pensions and allowances...	513 12 7	
			Invested	750 0 0	
			Balance :		1,263 12 7
			Cash at Bank... ...	1,551 14 9	
			„ at Office ...	48 19 4	
			Advances for travelling expenses ...	10 0 0	
					1,610 14 1
		£14,404 5 11			£14,404 5 11

Liabilities.	£ s. d.	Assets.	£ s. d.
To sundry creditors	1,427 12 0	By cash at Bank and at Office ...	1,600 14 1
„ balance	1,656 6 7	„ H.M. Exchequer	975 0 0
		„ sundry debtors	508 4 6
	£3,083 18 7		£3,083 18 7

Note.—On December 31st the amount of 2½ per cent. Consols held by the Council for the provision of superannuation annuities was £2,368 6*s.* 5*d.*

* Some expenses not yet brought to account.

572. *Instruments: Small Repairs to Barometers.*—Read—(M.O. 501) from the Hydrographer suggesting that a supply of "shades" for barometers should be sent to Bermuda so that a broken shade could be replaced on the spot, thus avoiding the necessity for sending the instrument to England.

Approved.

573. *Wind Values: Velocity Equivalents of Beaufort Scale* (Minute 556).—The Secretary submitted diagrams representing the relation between wind velocities and corresponding Beaufort scale estimates at Scilly (1881–1896), Fleetwood and Morecambe Bay Lightship (1888–1895), and Holyhead (1900–1902), and showing the effect of obtaining a table of mean values of equivalents on the two methods referred to in Minute 556.

The Secretary was directed to prepare a statement as to the tables of equivalents which have been already published in this country and elsewhere.

574. *Publications: Presentation Copies.*—(1) It was resolved to present copies of the Pilot Charts to the Library of the Vienna Meteorological Office (M.O. 331).

(2) The Secretary was authorised to send the Daily Weather Report, free of charge, to Mr. W. H. Smith, of Fisher, Perry & Co., Limited, Wolverhampton, for the quarter ending 31st March, 1903 (M.O. 279).

575. *Telegraphic Reporting Stations, Loughborough.*—Reported—That the observer at Loughborough had discontinued his observations on account of ill-health (M.O. 131), and that apparently he had no intention of resuming them.

576. *Logs.*—Six received, none excellent; one short log, three lighthouse registers, and three sets of barographic curves from the Navy.

577. *Storm Warnings:*—

The signals were hoisted on nine days, the total number of districts warned, 53.

In 29 districts the warnings were justified by subsequent gales (force 8 and upwards), and in 21 districts by strong winds (force 7 or 6). In three districts they were not required.

Gales Experienced for which no Warnings were Issued.—None.

578. *Accounts.*—Submitted—The following statement:—

	£	*s.*	*d.*
Cash balance on 10th February...	5,534	9	5
Receipts from 11th to 26th February	63	4	10
	5,597	14	3
Cheques drawn from 11th to 26th February	340	13	2
Cash balance on 26th February	£5,257	1	1

579. *Library.*—It was resolved to address a letter to the Foreign Office to ascertain whether a presentation copy of the Valdivia report could be obtained from the German Government.

580. *Library.*—List of publications received since the last meeting:—

Bachmetjew, P.—Der Gegenwärtige Stand der Frage über elektrische Erdströme.

Batavia, Kon. Magnetisch en Meteorologisch Observatorium.—Regenwaarnemingen in Nederlandsch-Indië. 23. Jaarg. 1901.

Borchgrevink, C. E.—Magnetic and meteorological observations made by the "Southern Cross" Antarctic Expedition, 1898–1900, under the direction of C. E. Borchgrevink. Published by the Royal Society of London.

Dorpat, Meteorologisches Observatorium.—Meteorologische Beobachtungen angestellt in Jurjew. 36. Jahrg.

Gautier, R.—Observations météorologiques faites aux fortifications de Saint-Maurice pendant l'année 1901.

—— —— Résumé météorologique pour Genève et le Grand Saint-Bernard. 1901.

Glyde, E. E.—Meteorological observations at Statsford, Whitchurch, Tavistock. 1902.

Harvey, C. Wigan.—Meteorological observations, Throcking Rectory. 1902.

Havana, Observatorio del Colegio de Belen de la Campañia de Jesus.—Observaciones magnéticas y meteorologicas. 1879, 1880. 2 vols.

Heintz, E. A.—Liste systématique et alphabétique des travaux météorologiques et magnétiques, publiés par l'Acad. Imp. des Sc. de St. Petersbourg et l'Observatoire Physique Central Nicolas depuis 1894 jusqu'en 1900 incl.

Jersey. Observatoire St. Louis.—Bulletin des observations magnétiques et météorologiques. 9e année, 1902.

Kaminsky, A.—Determination of absolute heights of the barometers of the meteorological stations of Asiatic Russia.

Kidderminster, Medical Officer of Health.—Reports on the health of the Borough by the Medical Officer of Health and Sanitary Inspector. 1902.

* *London, Board of Trade Commercial, Labour and Statistical Department.*—Statistical abstract for the several Colonial and other Possessions of the United Kingdom in each year from 1887 to 1901. 39th number.

*—— —— Statistical tables relating to the Colonial and other Possessions of the United Kingdom. Parts 24, 25, 1899, 1900. 2 vols.

London, Meteorological Office.—London fog inquiry, 1901–2. Report to Meteorological Council by Capt. Alfred Carpenter, R.N.

—— —— Meteorological observations at stations of the second order. 1899.

Madrid, Observatorio.—Resumen de las observaciones meteorológicas efectuadas en la Peninsula y algunas de sus islas adyacentes durante los años 1897 y 1898.

Mitchell, J. Cairns.—Meteorological data exhibiting the special features and peculiarities of climate of the Wirral Peninsula, Liverpool and District, and along the coast to Southport and neighbourhood.

—— —— Results of meteorological observations taken in Chester during 1901.

Quervain, A. de.—Note sur les ballons sondes lancés en Russie.

St. Petersburg, Nicolas Central Physical Observatory.—Report of the Nicolas Central Physical Observatory for 1900. Presented to the Imp. Acad. Sc. by M. Rikatcheff.

Semenoff, I.—Paths of barometrical maxima in Europe, 1889–1893.

Sresnewsky, B.—Einige geometrische Sätze über die Krümmung eines Luftstroms in atmosphärischen Wirbeln.

63, *Victoria Street, S.W., 11th March*, 1903.

PRESENT:

SIR R. STRACHEY (IN THE CHAIR).

MR. BUCHAN.	THE HYDROGRAPHER.
PROFESSOR DARWIN.	MR. SHAW (*Secretary*).

581. The Minutes of the last meeting (27th February) were read and confirmed.

582. *London Fog Inquiry* (Minutes 407, 432, 566).—Read—The following letter:—

M.O. 584.

London County Council,
County Hall, Spring Gardens, S.W.,
5th March, 1903.

SIR,

Adverting to your letter of 30th December, 1902, upon the subject of the inquiry into the cause and distribution of London fog, I am directed to thank you for the report which you have made on the subject, and to say that it is with regret that the Council has decided that it is unable to authorise any further expenditure in the direction suggested by the Meteorological Council.

I enclose for your information a copy of the report† on the subject made by the General Purposes Committee to the Council on Tuesday, the 3rd instant.

I am, &c.,
G. L. GOMME,
Clerk of the Council.

The Secretary,
Meteorological Office.

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* Purchased. † Not printed here.

The Secretary was directed to acknowledge the receipt of the letter, and to inform the County Council that the Council would report in due course upon the observations made in continuation of the inquiry during the past winter.

583. *Instruments: Kikuyu, British East Africa* (Minutes 498, 549).—A draft letter to the Foreign Office (P.C. 709), submitted by the Secretary in pursuance of Minute 549, was approved.

584. *Antarctic Co-operation* (Minutes 550, 567).—A draft letter (P.C. 710) in reply to M.O. 354 and 567 was approved, together with a letter of inquiry (P.C. 395) to the Secretary of the Royal Society upon the subject of the mode of dealing with the observations in connexion with the National Antarctic Expedition.

585. *International Balloon Investigation.*—Read—Letter (591) from Professor Hergesell, President of the International Sub-committee for Scientific Aeronautics, informing the Council that Mr. Alexander, of Bath, was willing to provide for a series of ascents of pilot balloons at Bath in the ensuing months of the current year at his own cost, and requesting the Council to arrange for sending "ein jüngerer Gelehrte" for about a fortnight to Paris or Strassburg to be trained in the method of managing the ascents in preparation for the work, Mr. Alexander having also expressed his willingness to bear the cost of the training.

The Secretary was directed to make further inquiry as to the proposed arrangements.

586. *Instruments: Supply for the Transvaal* (Minute 570).—The Secretary reported that, in pursuance of a suggestion made at a meeting of the Treasury Committee, he had made inquiry as to the practice followed in other departments as regards the purchase of instruments and had received from Sir T. H. Elliott the following memorandum with regard to the practice in the Ordnance Survey Office.

MEMORANDUM.

When a sufficient quantity of any class of stores is required to justify the expense and labour involved, stores for the Ordnance Survey are ob ained by open competition.

Advertisements calling for tenders are inserted in the papers considered most suitable in each particular case. These advertisements state where forms of tender can be obtained, and up to what time tenders will be received. As a rule, at least a fortnight is allowed between the first advertisement and tne last date for receipt of tenders. Forms of tender are sent, even if not asked for, to firms known to be able to supply satisfactorily the stores in question. Two forms of tender are annexed which illustrate generally the procedure adopted.

When the quantity of any class of stores is not considered large enough to make it worth while to resort to open competition, forms of tender are sent out to firms of good standing known to be able to supply satisfactorily the articles required. Unless the quantities required are very small, as many competent firms as possible are invited to tender.

587. *Colonial Observations, Cape Pembroke* (Minute 568).—It was resolved that a rain gauge be sent to the Governor of the Falkland Islands for use at Cape Pembroke, and that the barograph and sunshine recorder left at the station by the Scottish Antarctic Expedition be lent to the Governor for the use of the station until otherwise determined.

Also that suitable meteorological publications be sent from time to time for the use of the observer in accordance with the suggestion in Mr. Bruce's report.

588. *Marine Observations: Suggested Agency at Sunderland.*—Read—M.O. 480 from J. J. Wilson & Sons, Opticians, agents for the sale of Admiralty charts in Sunderland, offering to act as agents for the supply of instruments to the Mercantile Marine, and to exhibit the Daily Weather Report if sent to them for the purpose.

It was resolved to accept the offer of Agency under the usual conditions, and to send the Daily Weather Report for exhibition.

589. *Wind Values: Beaufort Scale Equivalents* (Minute 573).—Submitted—The following list of existing scales of equivalents :—

Admiral Beaufort's Scale of Wind Force and the Equivalent Velocities in Miles per Hour according to different authorities.

Beaufort's Scale of Wind Force.	Snow Harris, 1857.	Schott, 1861.	James, 1861.	Fitz-Roy, 1863.	Symons, 1866.	Jelinek, 1869.	Buchan, 1871.	Board of Trade, 1872.	Laughton, 1875.	Meteorological Office, 1875.	Deutsche Seewarte, 1876.	White, 1877.	Wyville Thomson, 1878.	Wyman, 1878.	Dictionary, 1878.	U.S. Hydrographic Office, 1878.	Sprung, 1879.	Mohn, 1883.	Chatterton, 1887.	Waldo (from anemometers on board ship), 1887.	Krümmel, 1892.	Ben Nevis Observatory, 1902.
0	0·68–1·06	0	0	—	0	0			0	3	3	—	—	—	3	0	—	3	4·9	—	—	0
1	2·0–3·3	1	7	—	8	2			2	8	8	—	1·5	1–2	8	1–2	6	8	6·5	7·83	—	6
2	3·8–7·6	4	14	5	14	3			4	13	13	—	2	4	13	4	9	13	7·8	11·86	7·6	12
3	8·0–12·0	10	21	10	21	5			8	18	18	—	4·5	9	18	9	12	18	11·6	14 32	11·4	21
4	13·0–16·5	17	28	18	28	7			16	23	23	—	8	14	27	14	15	23	17·0	16·55	15·9	30
5	17·0–18·0	24	35	25	35	12			24	28	28	16	12·5	17	28	17	18	28	22·9	19·91	21·0	39
6	18·67–20·0	32	42	33	42	15			32	34	34	20	18	20	34	20	21	34	28·3	26·17	26·2	49
7	20·14–24·0	40	49	40	50	22			40	40	40	26	24·5	24	40	24	24	40	35·4	30·20	31 8	60
8	26·4–34·0	48	57	55	57	31			50	48	48	31	32	30	48	30	27	48	41·6	35·79	36·2	72
9	34·0–59·0	56	64	63	64	37			62	56	56	—	40·5	40	56	40	—	56	46·0	42·28	—	84*
10	59·0–83·6	67	71	70	71	43			78	65	65	—	50	67	65	67	—	65	52·1	—	—	97*
11	90·12–90·34	82	78	78	78	57			96	75	75	—	61	80	75	80	—	75	—	—	—	112*
12	107·7–120·0	100	85	85	85	68			120	90	90	—	72	100 and upwards.	90	100 and upwards.	—	90	—	—	—	130*

Same as James. Same as M.O.

* Approximately.

Scales of Wind Force other than Beaufort's and their Equivalent Velocities in Miles per Hour (converted from Meters per Second when necessary).

Buchan, 1867.		Kingston, 1878.		Mascart, 1883.		Mohn, 1883. Land Scale.		Chase, 1884.		Davis, 1894.		Fitz-Roy, 1863.		Glaisher, 1863.		Cator, 1874.		French Scale, 1879.		Wild, 1875.		Mohn, 1877.		Omond, 1893.	
F.	V.	F.	V.	F.	V.	F.	V.	F.	V.	F.	V.	F.	V.			F.	V.	F	V.	F.	V.	F.	V.	F.	V.
0·0	0·0	0	0–2	0	0	0	0–0·5	0	—	0	0	1	10	0·25		1	8	0	0–1	1	4·5	0	0	0	2
0·1	1·4	1	2–4	1	4	1	0·5–4	1	1–2	1	2	2	25	0·5		2	16	1	1–9	2	8	1	7·5	1	7
0·5	7·1	2	4–8	2	15·5	2	4–7	2	3–5	2	7 or	3	40	0·75		3	24	2	9–16	3	10	2	13	2	13
1·0	14·1	3	8–16	3	25	3	7–11	3	6–14		less.	4	55	1·0		4	32	3	16–25	4	13·5	3	22·5	3	21
1·5	21·2	4	16–25	4	37	4	11–17	4	15–24	3	11	5	70	1·5		5	40	4	25–38	5	17	4	31	4	29
2·0	28·3	5	25–35	5	46·5	5	17–28	5	25–39	4	18 or	6	85*	2·0		6	48	5	38–63	6	20	5	38	5	38
2·5	35·4	6	34–44	6	62	6	Over 28	6	40–59		more.			2·5		7	56	6	63 and	7	25			6	47
3·0	42·4	7	44–55	7	100			7	60–69	5	27			3·0		8	64		above.	8	31			7	57
3·5	49·5	8	55–67					8	70–79	6	36			3·5		9	72				(about).			8	67
4·0	56·6	9	67–80					9	80–99	7	45			4·0		10	80			9	42·5			8	77
4·5	63·6	10	Above 80					10	100 and	8	58			4·5		11	88				(about).			10	88
5·0	70·7								upwards.	9	76			5·0		12	96							11	99
5·5	77·8									10	95			6·0										11–12	111
6·0	84·8																								

Description of the Wind Forces given by the Beaufort Scale.

Force.	Beaufort.	Snow Harris.
0	Calm	Gentle breathing airs.
1	Light air, or just sufficient to give steerage way	Extremely light airs; would fill a light balloon calico sail of a small yacht.
2	Light breeze — Or that in which a well-conditioned man-of-war with all sail set, and "clean full," would go in smooth water from 1–2 knots.	Light gentle breezes; would fill the light sails of a large ship aloft, or light duck sails; usually called gentle breezes.
3	Gentle breeze — and "clean full," 3–4 „	Moderate fresh breezes; ships carry a crowd of sail.
4	Moderate breeze — would go in smooth 5–6 „	Moderately strong breezes; top-gallant sails and royals.
5	Fresh breeze — Royals, &c.	Fresh winds; top-gallant breezes.
6	Strong breeze — Or that to which she could just carry in "chase" "full and by" — Single-reefed topsails or top-gallant sails.	Very fresh winds and moderate gales; whole and reefed topsail breezes.
7	Moderate gale — Double-reefed top-sails, jib, &c.	Strong winds and gales; double-reefed topsails and courses.
8	Fresh gale — Triple-reefed top-sails, &c.	Very strong winds and storms; close-reefed topsail gales.
9	Strong gale — Close-reefed topsails and courses.	Heavy gales and storms.
10	Whole gale, or that with which she could scarcely bear close-reefed main topsail and reefed foresail.	Very heavy gales, storms, tempests.
11	Storm, or that which would reduce her to storm stay sails.	Hurricanes, extremely heavy gales, and tornados.
12	Hurricane, or that which no canvas could withstand	Violent hurricanes which blow down buildings.

Force.	Symons.	Meteorological Office.	Deutche Seewarte.
0	Calm	Same as Beaufort	Calm, or very light air.
1	Gentle breeze		Light air.
2	Moderate		Slight wind.
3	Fresh		Gentle wind.
4	Very fresh		Moderate wind.
5	Strong		Fresh wind.
6	High wind	Top-gallant sails	Strong wind.
7	Moderate gale	Topsails, jib, &c.	Very strong wind.
8	Gale	Reefed upper topsails and courses	Stormy wind.
9	Fresh gale	Lower topsails and courses	Storm.
10	Strong gale	Lower main-topsail and reefed foresail	Heavy storm.
11	Storm	Same as Beaufort	Severe storm.
12	Hurricane		Hurricane.

Description of the Wind Forces given by the Beaufort Scale U.S. Hydrographic Office.

Force.	Nautical Designation.	Sail that a full-rigged ship may carry, close hauled by the wind; also her probable speed.	Sail that a full-rigged ship may carry, wind on quarter; also her probable speed.
0	Calm	All sail	All sail.
1	Light airs	All plain sail, stay sails; smooth sea; 0·5–1 knot per hour.	All plain sail and studding sails; smooth sea; 1–1·5 knots per hour.
2	Light breezes	All plain sail, stay sails; smooth sea; about 2 knots.	All plain sail and studding sails; smooth sea; 2·3·5 knots.
3	Gentle breezes	All plain sail, stay sails; smooth sea; 3–4 knots.	All plain sail and studding sails; smooth sea; 4–5 knots.
4	Moderate breezes	All plain sail and stay sails; 5–6 knots	All plain sail and studding sails; smooth sea; 6–7 knots.
5	Stiff breezes	All plain sail, top-gallant sails; stay sails; moderate sea, 6–7 knots.	All plain sail and studding sails; moderate sea; 8–9 knots.
6	Fresh breezes	Courses, single reefed topsails, top-gallant sails, moderate sea; 7–9 knots.	All plain sail to top-gallant sails; lower and topmast studding sails; moderate sea; 10–12 knots.
7	Very fresh breezes	Courses, double reefed topsails, fore topmast stay-sails; moderate sea; about 7 knots.	Courses, single-reefed topsails, top-gallant sails; moderate sea; 12–14 knots.
8	Moderate gale	Single-reefed fore and main topsails, close-reefed mizzen, fore topmast stay-sail; rough sea, 4–5 knots.	Single-reefed courses, double-reefed fore and main topsails, close-reefed mizzen; rough sea; about 10 knots.
9	Strong gale	Close-reefed courses, close-reefed fore and main topsails, storm stay-sails; rough sea.	Close-reefed courses, close-reefed fore and main topsails, storm stay sails; rough sea.
10	Very strong gale	Close-reefed foresail, close-reefed main top sail, fore storm stay-sail; very rough sea.	Close-reefed foresail, close-reefed main top-sail, fore storm stay-sail; very rough sea.
11	Violent gale	Storm sails, or close reefed main topsail and fore-storm staysail; very rough sea.	Close-reefed foresail, close-reefed main top-sail, fore storm stay sails.
12	Hurricane / Typhoon / Cyclone	None; lying to; drifting bodily to leeward.	Scudding under bare poles.

Submitted—Also an additional diagram representing the percentage frequency of the several velocities in the estimates of the different numbers of the Beaufort scale for the observations at Scilly, 1881–1896.

Professor Darwin submitted a memorandum suggesting a method of correcting the Beaufort scale estimates in such a manner as to make a single table of values available for converting Beaufort scale estimates into velocities, and for identifying the Beaufort scale values which should correspond normally with given velocities. He undertook to prepare the memorandum for printing.

590. *Ice Observations for the Danish Office* (M.O. 515) (Minutes 1900–1901, page 26).—Submitted—The following memorandum from Captain Hepworth :—

Either directly, or through this Office, the Danish Institute received observations in 1900 from the "Balaena," "Nova Zembla," "Erik," and "Lady Head"; in 1901 from the "Balaena," "Nova Zembla," and Hudson Bay Company's steamer "Pelican"; in 1902 from the "Balaena," and "Lady Head." The observations contributed by the "Balaena," and "Lady Head" in 1902 were sent through this Office; forms may have been received direct from other vessels; the Institute did not send their Report to this Office for last year. On the 4th inst. I wrote and sent forms to the Captains of the "Nova Zembla," "Balaena," "Eclipse," "Diana," "Erik," "Lady Head," "Pelican," "Active," and "Esquimaux."

Approved.

591. *Wireless Telegraphy* (Minute 551).—Read—The following letter :—

M.O. 585.

Lloyd's,
6th March, 1903.

SIR,

With reference to your letter of the 4th March regarding the proposed scheme for obtaining weather information from vessels at sea by means of wireless communication, I beg to inform you that I quite concur with your views that—

1. The message should be sent from a ship when she is passing over a particular degree of longitude, and as soon as I can obtain definite information as to the distance at which we may be sure of communicating with vessels from Innistrahull and Malin Head on the one side and Brow Head and the Fastnet Rock on the other, I shall communicate with you again.
2. That the messages should consist of the latitude, the barometer reading, and direction and force of wind.
3. Messages should be transmitted by telegraph from the Signal Station to the Meteorological Office, London.
4. Messages should be in code form. I presume that the Meteorological Office would pay any small sum that may be required for the preparation of the code.

I think that a word code would answer this special purpose better than a figure code. It would be easy to compile a suitable code and I do not think there could be any objection to the code being a two-word code. If you could send me the phrases I could have a code prepared.

I am, &c.,
H. HOZIER,
Secretary.

The Secretary,
Meteorological Office.

Submitted—A form for a code in accordance with the letter.

The form of code was approved and the cost of preparing it by Lloyd's was authorised.

592. *Bournemouth Sunshine Records* (Minutes 439, viii.).—Reported that the records received from Bournemouth were still unsatisfactory.

The Secretary was directed to arrange, if possible, for the exposure of an independent sunshine recorder at Bournemouth for the purposes of comparison.

593. *Royal Meteorological Society.*—The Secretary reported that he had been requested by the Society to prepare a paper on the gale of 27th February and that he proposed to comply with the request.

Approved.

594. *Harvest Forecasts* (Minute 340).—It was agreed to issue the circular regarding harvest forecasts in the same form as last year.

595. Submitted—The following report on the forecasts issued at 8.30 p.m. daily during the month of February 1903 :—

The letters used have the following signification :—

a = complete success. | c = partial failure.
b = partial (*i.e.*, more than half) success. | d = total failure.

Districts.		Percentages. Wind.	Weather.	Average Forecast.	Percentage of Success. a + b.
Scotland, N.	a	37	81	59	91
"	b	48	15	32	
"	c	11	4	7	
"	d	4	0	2	
Scotland, E.	a	37	70	54	89
"	b	48	22	35	
"	c	11	8	9	
"	d	4	0	2	
England, N.E.	a	56	56	56	91
"	b	41	29	35	
"	c	0	15	8	
"	d	3	0	1	
England, E.	a	63	56	60	95
"	b	33	37	35	
"	c	4	7	5	
"	d	0	0	0	
Midland Counties	a	63	56	60	95
"	b	33	37	35	
"	c	4	7	5	
"	d	0	0	0	
England, S.	a	63	56	60	97
"	b	33	41	37	
"	c	4	3	3	
"	d	0	0	0	
Scotland, W.	a	46	73	60	89
"	b	39	19	29	
"	c	15	8	11	
"	d	0	0	0	
England, N.W.	a	54	65	60	96
"	b	38	35	36	
"	c	8	0	4	
"	d	0	0	0	
England, S.W.	a	65	73	69	96
"	b	31	23	27	
"	c	0	4	2	
"	d	4	0	2	
Ireland, N.	a	58	73	66	95
"	b	31	27	29	
"	c	11	0	5	
"	d	0	0	0	
Ireland, S.	a	62	50	56	93
"	b	27	46	37	
"	c	7	4	5	
"	d	4	0	2	
Summary.					
British Islands	a	55	65	60	93
"	b	36	30	33	
"	c	7	5	6	
"	d	2	0	1	

596. *Telegraphic Reporting Stations.*—The Secretary reported that in addition to Loughborough, Newton Reigny (Mr. T. G. Benn) would cease reporting shortly (M.O. 541).

It was agreed that, failing a substitute for Mr. Berridge at Loughborough, the Borough Authorities of Nottingham be approached with the view of obtaining telegraphic observations from that locality.

597. *Forecast Districts.*—The sum of £100 was placed at the disposal of the Secretary during the coming year, to be renewed from time to time if the Council think fit, for the purpose of classifying and arranging the climatological data of the various stations in one or more of the forecast districts of the British Isles for a series of years according to the various conditions under which the forecasts are issued, and observations of temperature and the like are recorded in order to test the possibility of improving the existing system of forecasts and the representation of meteorological conditions by revising the lines of demarcation of the districts or of sub-dividing them with a view to local application.

598. *Office Staff.*—(1) The Secretary reported that Mr. Gaster had been in indifferent health for some time past and, with deference to the wishes of the Council in the matter, was desirous of resigning his present appointment.

The resignation was accepted, and it was resolved that, in consideration of Mr. Gaster's long and faithful services in connexion with the Office from his first appointment under the Board of Trade in 1859, a sufficient sum of 2½ per cent. annuities be appropriated for the purchase on his behalf of a life annuity of £150 from the Commissioners for the reduction of the National Debt.

599 (2). *Messengers.*—The Secretary reported that in pursuance of Minute 480 he had appointed S. Elsdon, aged 14, with wages 9*s.* 6*d.* per week from 22nd December, 1902, to be raised, if approved, in April, 1904; and A. H. Stubbs, aged 13, at 7*s.* 6*d.* per week from 2nd February, to be raised to 10*s.* per week after six months' service, and that he had selected a suitable uniform to be ordered from Messrs. Hobson & Sons at a cost of £2 5*s.* 6*d.*, exclusive of overcoats and boots.

600. *Logs.*—Six received, one excellent (Captain J. W. C. Martyr).

601. *Storm Warnings.*

Warnings Issued.—The signals were hoisted on 7 days; the total number of districts warned being 43.

In 25 districts the warnings were justified by subsequent gales (force 8 and upwards), and in 14 districts by strong winds (force 7 or 6); in 4 districts they were not required.

Gales experienced, for which no Warnings were issued.—None.

FREDC. GASTER.

602. *Reports of Work for February:—*

MARINE BRANCH.

Examined 12 new meteorological logs, 2 short meteorological logs, and 3 lighthouse registers.

Discussion south of Equator, between the west coast of Africa and 90° W. longitude. March and April Charts, with air isotherms added, passed for revise, and July original Chart sent for engraving.

Indian Ocean District—from latitude 30° N. to 30° S. Preparing and extracting data in Office logs; also totalling instrumental observations and tabulating winds. Making list of logs of H.M. ships required for discussion.

Monthly Pilot Chart of the North Atlantic and Mediterranean—March, 1903, proofs examined and passed for press. April Chart sent to the lithographer. Charting sea temperatures for December, 1902, and January and February, 1903; also charting pressure observations and obtaining tracks of storms for December, 1902, and January, 1903. Registering and acknowledging reports of sea temperatures, barometer, &c., and issuing Charts and fresh supply of Forms. 118 reports containing observations to be used for the Charts received during the month.

Sailing Directions for China Sea:—Meteorological results at several stations for publication in new issue sent to Admiralty.

CAMPBELL HEPWORTH.

MONTHLY RETURN OF "A." AND "M.O." INSTRUMENTS.

February, 1903.

—	Barometers.	Aneroids.	Thermometers.					Screens.	Hydrometers.	Rain Gauges.	Anemometers.	Storm Cones.	Sunshine Recorders.	Glass Spheres.	Miscellaneous.
			Ordinary.	Maximum.	Minimum.	Solar Radiation.	Terr. Radiation.								
"A" ACCOUNT.															
Dr.															
On charge, 1st Feb., 1903	62	135	217	117	132	—	—	45	9	2	—	—	—	—	
Received since	10	—	4	—	—	—	—	—	—	—	—	—	—	—	
	72	135	221	117	132	—	—	45	9	2	—	—	—	—	
Cr.															
Sent out during month...	9	22	50	12	15	—	—	6	—	—	—	—	—	—	
On charge, 1st Mar., 1903	63	113	171	105	117	—	—	39	9	2	—	—	—	—	
"M.O." ACCOUNT.															
Dr.															
On charge, 1st Feb., 1903	16	2	8	9	3	1	6	—	78	8	1	5	—	6	
Received since	2	—	150	—	3	—	—	22	4	—	—	—	2	—	
	18	2	158	9	6	1	6	22	82	8	1	5	2	6	
Cr.															
Sent out during month...	4	—	14	1	1	—	1	1	8	2	—	4	1	1	
On charge, 1st Mar., 1903	14	2	144	8	5	1	5	21	74	6	1	1	1	5	

R. F. WALLACE.

OBSERVATORY BRANCH.

Daily Means.—Progress has been made with the calculation of mean values for 1900, but until the form which the revised publication is to take has been settled the tables cannot be completed.

Beaufort's Scale Equivalents.—An enquiry has been made as to the effect of dealing with this matter on lines suggested by Dr. Köppen. Old data have been rearranged and fresh data obtained, and the results shown on a series of large diagrams.

Miscellaneous :—

(1) Data respecting mean and extreme temperature at Kew prepared for the Metropolitan Asylums Board.
(2) Sunshine recorder at Margam Park returned to Meteorological Office, readjusted and tested.
(3) Measurements made for determining the scale value and action of the Dines barograph.
(4) Correspondence respecting breakdown of anemometer at Fleetwood.
(5) The hourly tabulation of sunshine records at the observatories has been carefully checked.
(6) Holyhead anemograms tabulated, and weekly return sent to Dublin.
(7) Ben Nevis observations copied for Professor Hergesell.

Assistance from the Forecast Branch.—Anemograms have been tabulated for *Fleetwood*, November to December; *Scilly*, April to December; *Kingstown*, April to October, 1902; in all, 18 months.

R. H. CURTIS.

FORECAST AND STORM WARNING BRANCH.

Daily Weather Report.—1902. Title page and frontispiece issued, thus completing the final volume for the year. 1903. All numbers issued to date and a supplementary copy of that for 27th issued on 30th. Monthly corrections and additions sheets for December and January issued. New "copy" for Maps IV. and V. prepared to end of April. Much special work by Mr. Brodie.

Weekly Weather Report, 1902 and 1903.—Charts, Daily Remarks, General Notes, and Weekly Remarks done to date.

Monthly Supplements.—Notes on p. 1 and lithographed maps done to end of January.

Storm Warning Checking (primary).—Done to date.

Forecast Checking (8.30 p.m.).—Done to date by Mr. Lempfert. Summarized in Telegraph Branch.

Checking Observatory Tabulations.—Fleetwood.—Anemograph, November and December, 1902. *Scilly.*—Anemograph, April to December, 1902. *Kingstown.*—Anemograph, April to October, 1902.

FREDC. GASTER.

STATISTICAL AND LIBRARY BRANCH.

1. Issue of Publications :—

Daily and weekly publications regularly issued.

Monthly Summary of the Weekly Weather Report for December, 1902, received and issued.

Pilot Charts for March, 1903, received, and 298 copies issued; also 141 copies of charts for previous months issued to Captains of ships and others.

Presentation copies of publications, 38 in all, issued to Captains and Officers of ships and others.

Meteorological Observations at Stations of the Second Order for 1899 (Official No. 156) received and 221 copies issued.

London Fog Enquiry, 1901–1902, received and 75 copies issued.

Appendix I. of the Weekly Weather Report, 1902—fourth quarter and annual—received and issued.

2. Statistical and Station Work :—

Tables for the weekly issues of the Weekly Weather Report prepared to date and carried through the press.

Tables, and Maps Nos. 1, 3, and 4, for the Monthly Summary of the Weekly Weather Report for January, 1903, prepared and carried through the press.

Appendix I. to the Weekly Weather Report, 1902, fourth quarter and annual, read in proof and signed for press.

Appendix II. to the Weekly Weather Report for 1902 read in proof and signed for press.

Preface to the Weekly Weather Report for 1902 prepared and sent to the printer.

New frontispiece map for Weekly Weather Report, 1902, showing stations, prepared and sent to lithographer.

Ten day means of observations at five British Stations prepared and regularly supplied to Dr. Neumayer, of Hamburg.

Results of daily observations of Temperature and Rainfall prepared and regularly supplied to the Registrars-General for their Weekly Returns, viz., for

England and Wales from 14 Stations.
Ireland „ 6 „

Returns from Stations of the Second Order, for 1900, proceeded with.

Summaries for the Quarterly Return of the Registrars-General for England and Wales and for Ireland proceeded with.

3. Library :—

Accessions to Library received, press-marked, and catalogued on cards.

Some time occupied on re-arrangement of books consequent on the fitting up of a new set of shelves in Room No. 14.

4. Inquiries :—

Seventy-two inquiries were dealt with during February. Twenty of these were by letter, but in 52 cases personal application was made. In 22 cases of personal application payment was made for the preparation of the information supplied.

JOHN A. CURTIS.

603. *Audit.*—Reported—That the cash accounts for the quarter ended the 30th September last had been examined by Prof. Darwin and Dr. Buchan, and would be sent in due course to the Treasury for the Audit Office. The receipts from the 1st July last, when there was a balance of £1,690 2*s.* 7*d.*, were £3,764 18*s.* 5*d.* against £3,872 2*s.* 10*d.* in the corresponding period of the preceding financial year. The payments were £3,786 7*s.* against £3,601 0*s.* 4*d.* during the same period in the previous year. The balance in hand and at the bank on the 30th September, 1902, amounted to £1,668 14*s.*, and at the same date in 1901 to £2,400 15*s.*

604. *Accounts.*—Submitted—The following statement of accounts :—

	£	*s.*	*d.*
Cash balance on 26th February	5,257	1	1
Receipts from 27th February to 10th March ...	24	7	1
	5,281	8	2
Cheques drawn from 27th February to 10th March...	790	11	10
Cash balance on 10th March	£4,490	16	4

605. *Library.*—List of Publications received since the last meeting :—

Calcutta, Meteorological Office, Bengal.—Meteorological summary for the monsoon period of 1902.

**Copenhagen und Hamburg, Dänisches Meteorologisches Institut und Deutsche Seewarte.*—Tägliche synoptische Wetterkarten für den nordatlantischen Ozean und die anliegenden Theile der Kontinente. 15. Jahrg., 1-4 Quart., Dez. 1895-Nov. 1896. 4 vols.

Hildebrandsson, H. Hildebrand.—Rapport sur les observations internationales des nuages au Comité International Météorologique. 1. Historique, circulation générale de l'atmosphère.

Hoylake and West Kirby Urban District Council. Meteorological Department.—Report and results of observations, for the year 1902, by Tom Robinson.

**Linke, Franz.*—Moderne Luftschiffahrt.

London, Admiralty, Hydrographic Department.—Sailing directions for the South-East coast of Nova Scotia and Bay of Fundy. 5th edition.

—— —— *Hydrographic Office.*—The South America Pilot. Part i. 5th edition.

—— *Royal Society.*—Year-book of the Royal Society of London. 1902, 1903. 2 vols.

Paris, Service Hydrographique de la Marine.—Annales hydrographiques. 2e sér. Tome 24, 1902.

Utrecht, Koninklijk Nederlandsch Meteorologisch Instituut.—Meteorologisch Jaarbock. 1899-1901. 51-53 Jaarg. 3 vols.

* Purchased.

63, *Victoria Street, S.W., 25th March*, 1903.

PRESENT :

SIR R. STRACHEY, IN THE CHAIR.

THE HYDROGRAPHER. | MR. SHAW (*Secretary*).

606. The Minutes of the last meeting (11th March) were read and confirmed.

607. *London Fog Inquiry.*—The Secretary reported that he had given notice to the observers in London and the neighbourhood to terminate the observations for the winter on 28th March, and had expressed the thanks of the Council for the assistance rendered.

The Secretary's action was approved, and it was resolved also to discontinue the observations at the coastguard stations and to withdraw the thermographs from the Victoria Tower and St. Paul's Cathedral.

It was further resolved that Mr. Matthew's engagement as clerk for the special purposes of the fog inquiry be continued until 2nd May, to provide for the clerical work necessary for the completion of the report.

608. *Meeting of International Committee at Southport* (Minute 435).—In pursuance of Minute 435, the Secretary suggested that a member of the staff of the Forecast Branch should be sent to Southport for the period of the meeting, 8th to 16th September, and that a telegraphic report of observations should be sent there daily at 10 a.m. or 7 p.m., as may be found most convenient, at a daily cost of about 5*s.*, from which a map should be prepared at Southport for exhibition and lithographed, if facilities can be provided for that purpose by the Local Committee.

The Secretary also reported that he desired, if the Local Committee were able to afford suitable accommodation, to promote an exhibition at Southport of objects of meteorological interest in connexion with the meeting, and to carry out this suggestion he desired the authority of the Council to form a small voluntary committee to consist of two representatives of the Council, two of the Royal Meteorological Society, two of the Scottish Meteorological Society, Mr. R. H. Scott, Dr. H. R. Mill, and Mr. J. Baxendell, with power to add to their number, if the several Societies and persons should be willing to take part. He also reported that he proposed to visit Southport to make inquiries as to the local arrangements before Easter.

Approved.

609. *Earth Temperature Observations.*—The Secretary reported that he had ascertained, in connexion with the supply of information to the Registrar-General, that Dr. Rambaut was willing to arrange for the readings of a pair of earth thermometers, if they were sent to him, in comparison with the electrical earth thermometers installed at the Radcliffe Observatory, and that Dr. Chree would include observations of earth temperatures in the returns from Kew if the instruments were supplied.

He was authorised to supply a pair of earth thermometers for 1 ft. and 4 ft. (or such other pair of depths as might be suitable for comparison with the Radcliffe instruments) to Dr. Rambaut, and a pair of 1 ft. and 4 ft. instruments to Kew.

610. *Office Staff.*—In connexion with the retirement of Mr. Gaster, it was resolved:—

(1) That the limit of Mr. C. Harding's salary be extended to £300, the first increment of £5 to take effect from 1st April, 1903.

(2) That application be made to the Postmaster-General to ascertain if he is willing to supply a telegraph clerk to attend at the Office to receive and transmit messages between 8 a.m. and 10 a.m., and between 6.15 p.m. and 8 p.m., and, if so, upon what terms.

(3) That two additional female clerks be employed on probation for a year, at a commencing salary of £50 per annum, to assist in the work of the Statistical Branch and the Marine Branch in such manner as may be directed.

(4) That the consideration of further changes be postponed until a reply is received from the Postmaster-General with regard to (2).

611. *Instruments:*—

RETURN of SERVICEABLE INSTRUMENTS in the OFFICE and at HIS MAJESTY'S DOCKYARDS for the QUARTER ending 31st DECEMBER, 1902.

Place.	Particulars.	Barometers.		Thermometers.			
		Mercurial.	Aneroid.	Ordinary.	Max.	Min.	Screens.
Meteorological Office.	Available 1st Oct., 1902	96	144	173	86	81	50
	Received, new	—	—	108	20	20	10
	„ repaired and cleaned.	23	45	9	—	—	—
	Total	119	189	290	106	101	60
	Issued	28	38	97	22	15	6
	Total available 1st Jan., 1903.	91	151	193	84	86	54

RETURN of ADMIRALTY INSTRUMENTS for the QUARTER ending 31st DECEMBER, 1902.

Depôts.	BAROMETERS.								THERMOMETERS.															
	Mercurial.				Aneroid.				Ordinary.				Maximum.				Minimum.				Screens.			
	Est.	Store.	Surplus.	Shortage.	Est.	Store.	Surplus.	Shortage.	Est.	Store.	Surplus.	Shortage.	Est.	Store.	Surplus.	Shortage.	Est.	Store.	Surplus.	Shortage.	Est.	Store.	Surplus.	Shortage.
†Portsmouth	25	20	—	5	55	51	—	4	150	123	—	27	50	60	10	—	50	64	14	—	25	14	—	11
†Devonport	25	21	—	4	55	40	—	15	150	128	—	22	50	46	—	4	50	45	—	5	22	21	—	1
†Chatham	25	22	—	3	55	46	—	9	150	127	—	23	50	36	—	14	50	38	—	12	25	18	—	7
†Sheerness	6	5	—	1	15	12	—	3	30	15	—	15	10	9	—	1	10	8	—	2	10	7	—	3
*†Queenstown	5	—	—	5	10	2	—	8	15	9	—	6	8	6	—	2	8	6	—	2	—	3	3	—
(Dockyards, Home) Total	86	68	—	18	190	151	—	39	495	402	—	93	168	157	10	21	168	161	14	21	82	63	3	22
Gibraltar	2	2	—	—	2	2	—	—	4	8	4	—	3	3	—	—	3	3	—	—	—	—	—	—
†Malta	11	9	—	2	15	12	—	3	60	58	—	2	10	9	—	1	10	9	—	1	1	1	—	—
Bombay	4	3	—	1	3	3	—	—	10	5	—	5	4	2	—	2	4	4	—	—	1	2	1	—
Halifax	3	2	—	1	4	4	—	—	20	10	—	10	4	4	—	—	4	2	—	2	1	1	—	—
†Bermuda	3	1	—	2	4	3	—	1	20	10	—	10	4	3	—	1	4	4	—	—	1	1	—	—
Jamaica	3	2	—	1	2	4	2	—	10	10	—	—	2	—	—	2	2	1	—	1	1	1	—	—
Cape of Good Hope	7	5	—	2	8	10	2	—	33	32	—	1	8	7	—	1	8	6	—	2	2	2	—	—
Trincomalee	3	2	—	1	3	2	—	1	10	14	4	—	4	5	1	—	4	4	—	—	1	1	—	—
Hong Kong	17	11	—	6	21	16	—	5	87	74	—	13	21	18	—	3	21	22	—	—	5	11	6	—
Coquimbo (1st April, 1902) ...	2	1	—	1	4	3	—	1	15	11	—	4	2	3	1	—	2	4	1	—	1	1	—	—
Sydney	5	—	—	5	6	8	2	—	25	8	—	17	6	2	—	4	6	1	2	5	1	1	—	—
Esquimalt	4	2	—	2	5	8	3	—	15	18	3	—	2	2	—	—	2	2	—	—	1	2	1	—
(Dockyards, Abroad) Total	64	40	—	24	77	75	9	11	309	258	11	62	70	58	2	14	70	62	3	11	16	24	8	—
Grand Total and Net Shortage at Depôts	150	108	—	42	267	226	—	41	804	660	—	144	238	215	—	23	238	223	—	15	98	87	—	11
Meteorological Office... ...	45	91	46	—	120	151	31	—	250	193	—	57	80	84	4	—	80	86	6	—	50	54	4	—
Repairing	—	—	24	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Returnable from Depôts ...	—	—	19	—	—	—	12	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Ordered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	20	—
Net Surplus or Shortage at M.O.	—	—	89	—	—	—	43	—	—	—	—	57	—	—	4	—	—	—	6	—	—	—	24	—
Proposed to be Ordered ...	—	—	—	—	—	—	—	—	—	—	198	—	—	—	20	—	—	—	20	—	—	—	—	—

Approved, 21st March, 1903.

* Increased establishment.

† Supplies forwarded since 31st December, 1902.

R. F. WALLACE.

612. *Cloud Observations* (Minute 512).—The Secretary reported that the "herse néphescopique Besson," referred to by Prof. Hergesell, consisted of a row of equidistant vertical spikes projecting upwards from a horizontal bar and adjustable in azimuth over an orientation circle by means of a long vertical bar carrying the horizontal bar and its spikes and working in two eyes attached to a vertical scaffold pole. The whole apparatus was about 12–13 feet in height. According to M. Teisserenc de Bort it would cost about £1, and would require in addition a scaffold pole to be erected to carry it.

Fineman's nephoscope (see Hildebrandsson's and Hagström's "Principales méthodes employées pour observer et mesurer les nuages"), as well as those in possession of the Office proposed by Sir R. Strachey and Mr. Galton, were exhibited. (See catalogue of the Fourteenth Exhibition of Instruments, Roy. Met. Soc.)

The Secretary reported that Dr. Chree had expressed his willingness to make experiments upon observations of clouds with nephoscopes if the instruments were lent to him.

It was agreed to send two of the specimens of nephoscope to Kew for Dr. Chree, and to make further inquiry as to the observations that could be made at the other observatories.

613. *Colonial Observations* (Minutes 374, 386, 552).—Read—The following translation of a letter (M.O. 627) from Dr. Hann :—

M.O. 627. (Translation.)

Vienna,
10th March, 1903.

DEAR SIR,

MANY thanks for sending me the printed Zomba observations. I intend to make use of the results of these observations, especially of the daily variation in pressure, in the Meteorologische Zeitschrift.

The reports of the Army Medical Department which you kindly lent me have been returned some time ago, and ought by now to be in your hands.

I have read in your Report for 1901, in the October, 1902, volume of the Quarterly Meteorological Journal, that you intend to publish annually, in one volume, the reports of the observations made in the British Colonies, in so far as these are not published elsewhere. Meteorologists will be greatly indebted to you for this.

I have recently collected results of the meteorological observations from Malta (temperature means and rainfall) for 40 years, and published them in the Meteorologische Zeitschrift (February and next March). If possible, I intend to do the same for Bermuda, because the changes in position of the Atlantic sub-tropical barometric maximum, on the west side of which the Bermudas are situated, are of great interest in the study of the history of the climate of Europe and partly also of North America.

We need such tables from many points evenly distributed on the surface of the earth if we wish to study changes in pressure and temperature in their proper connexion. England, with its many Colonies, is especially called upon to render this service to science.

Many thanks for sending me the pilot charts.

I am, &c.,
J. HANN.

614. *Storm Signals, Dungarvan* (Minute 532).—Read—M.O. 647 from the Admiral Superintendent of Naval Reserves stating that the nearest coastguard station to Helvick Head already supplied with storm-signals was Dunmore, and suggesting that messages should be transmitted by telephone from Dungarvan post-office, which is much nearer to Helvick Head.

The Secretary was directed to ascertain upon what terms the messages could be sent as suggested.

615. *Observatories, Aberdeen* (Minutes 387, 410, 450).—The Secretary reported that Mr. G. A. Clarke had been in charge of the observations at Aberdeen, in succession to Mr. Boswell, under the direction of Professor Niven, from 1st January, and that all the arrangements for 7 a.m. observations and the corresponding telegrams had been working satisfactorily from that time.

The consolidation of the payments of the grant for the observatory (£275) and of the allowance for telegraphic reports (£19 10*s.*) into four quarterly payments to Professor Niven of £73 12*s.* 6*d.* each to cover both services, in accordance with the conditions set out in P.C. 2,654, 1902, was authorised.

Reported further—That the expenses incidental to the training of Mr. Clarke at Kew for the work amounted to £7 15*s.* 9*d.*, and that Professor Niven had expressed his willingness " to pay the whole or any part of it."

The Secretary was directed to accept the offer with thanks.

616. *Instruments: Mr. Dines' Barometer* (Minute 511).—Submitted—A report by Mr. R. H. Curtis (M.O. 812) upon a comparison between the readings taken from the records of the barometer and the Kew pattern station standard in use in the Office. The maximum of the differences observed at different points of the scale ranged between ·019 at 30·3 and ·023 at 29·7. It appeared that rapid changes were more quickly indicated by the Dines barometer than by the standard barometer.

It was agreed to make a further trial with a standard barometer of wider bore.

617. *Logs.*—Ten received—two excellent (Capt. W. B. Holmes and J. Wilson, 2nd Officer) ; also two abbreviated logs.

618. *Storm Warnings* :—

Signals hoisted on 10 days, total number of districts warned, 63.
In 32 districts the warnings were justified by subsequent gales (force 8 and upwards), and in 23 districts by strong winds (force 7 or 6). In 8 districts they were not required.

Gales experienced for which no warnings were issued.—None.

619. *Accounts: Insurance of Property in the Office.*—Resolved—To reduce the sum insured on the harmonic analyser from £300 to £200, and increase the sum insured on printed books from £250 to £350.

620. *Accounts.*—Submitted—The following statement :—

	£	*s.*	*d.*
Cash balance on 10th March	4,490	16	4
Receipts from 11th to 24th March	37	8	9
	4,528	5	1
Cheques drawn from 11th to 24th March	214	13	0
Cash balance on 24th March	£4,313	12	1

621. *Library.*— List of publications received since the last meeting :—

Aburi, Gold Coast.—Meteorological observations recorded at the Aburi Observatory during the year 1901, with yearly averages for 1895–1901.

—— —— Rainfall and number of days on which rain fell during the last 11 years (1891–1901) at Aburi.

Calcutta, Meteorological Office, India.—Instructions to observers of the India Meteorological Department. By J. Eliot. 2nd ed.

Copenhagen, Dansk Meteorologisk Institut.—Isforholdene i de arktiske Have. 1902.

Hamburg, Deutsche Seewarte.—Aus dem Archiv der Deutschen Seewarte. 25. Jahrg., 1902.

Hopkinson, John.—Meteorological observations taken at Holly Bank, Watford, during the year ending 28th February, 1877.

—— —— Meteorological observations taken at Holly Bank, Watford, during the half-year ending 31st August, 1877.

—— —— Meteorological observations taken at Watford during the year 1877.

—— —— Meteorological observations taken at Wansford House, Watford. 1878–1886. 9 vols.

—— —— The climate of Watford, deduced from meteorological observations taken during the 10 years 1877–1886.

—— —— Climatological observations taken in Hertfordshire in 1887–1896. 10 vols.

—— —— The climate of Hertfordshire, deduced from meteorological observations taken during the 12 years 1887–1898.

—— —— Meteorological observations taken in Hertfordshire, 1897, 1899, 1900. 3 parts.

London, Admiralty, Hydrographic Department.—Sailing directions for the West Coast of Scotland: the Mull of Galloway to Cape Wrath, including the Hebrides or Western Islands. 5th ed.

—— *Army Medical Department.*—Annual abstract of meteorological observations taken at Netley and stations abroad in the year 1900.

Nassau, Bahamas.—Meteorological observations, 1901–1902. 2 parts.

Scarborough, Borough Meteorologist.—The weather at Scarborough during the years 1901, 1902. 2 sheets.

Starr, W. H.—Report on medical transactions and sanitary report, &c., of Wei-hai-Wei for the year 1900.

Stockholm, Kongl. Svenska-Vetenskaps Akademie.—Meteorologiska iakttagelser i Sverige utgifna af Kongl. Svenska Vetenskaps-Akademien, anstälda och utarbetade under inseende af meteorologiska Central-Anstalten. Bd. 39–41, 2 dra ser., Bd. 25–27, 1897–1899. 3 vols.

Washington, Department of Agriculture, Weather Bureau.—Mereorological chart of the Great Lakes, 1902. Nos. 1 and 2. 2 vols.